The IRON AGE

Vol. 159, No. 19 May 8, 1947

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What Price War!

THE atomic bomb and the latest Russian gambit enjoy their brief flurries of popular concern. But, like a constant nagging pain, it is old HCL, the high cost of living, that rules the conversation at home, in the market place and in high government circles where they fret with policy. About everybody, today, seems both able and willing to quote the latest cost of living index number. Mutual recriminations chase each other through the newspapers. Each individual is twisting and turning, or carrying a picket sign, in a somewhat pathetic and desperate attempt to come to some kind of personal terms with a cruel wage-price spiral.

It is only natural that the bewildering economic pinch should become a political weapon, since politics is primarily an extension of economics. President Truman's attack on price structure has been pretty neatly calculated. That very important variable of political calculation—Public Opinion—is being persistently reminded of the rash assumption of price responsibility last fall as certain business spokesmen closed in on the OPA. Equally unfortunate from a public relations standpoint are the levels of recent corporate earnings, in certain instances of such size as to be considered indefensible even by Wall Street. Heavy industry's cries of innocence, of moderate and justifiable returns on net worth, are hard to hear as producers of non-durables, distilling, for instance, squeeze out profit ratios as fantastically high as 42 pct.

All this talk of moral suasion, of voluntary price cuts at the merchandising level, makes good newspaper copy. Selling pressures, not talk, will undoubtedly force food and textile prices to give ground, but durables and semi-durables will tend to bolster the price curves. There is every evidence that the economy is adjusting to a permanently higher general cost and price structure—a structure near, or possibly slightly higher, than the current level. Certainly heavy industry is in no position to lower prices despite the flood of persuasive telegrams from Washington. Absorption of the latest wage advances and the return of heavy selling expenses have pushed the break-even point up to near-capacity operations. These conditions will not ease for several years, until new equipment and technological innovations advance labor productivity to higher levels.

In all the wrangling about living costs attention is directed exclusively toward labor and management. These two factors certainly have great emotional appeal, but their influence is relatively negligible as compared to two other influences seldom mentioned—that is, payment for the most destructive war in history and support of the country's role of world power and policeman.

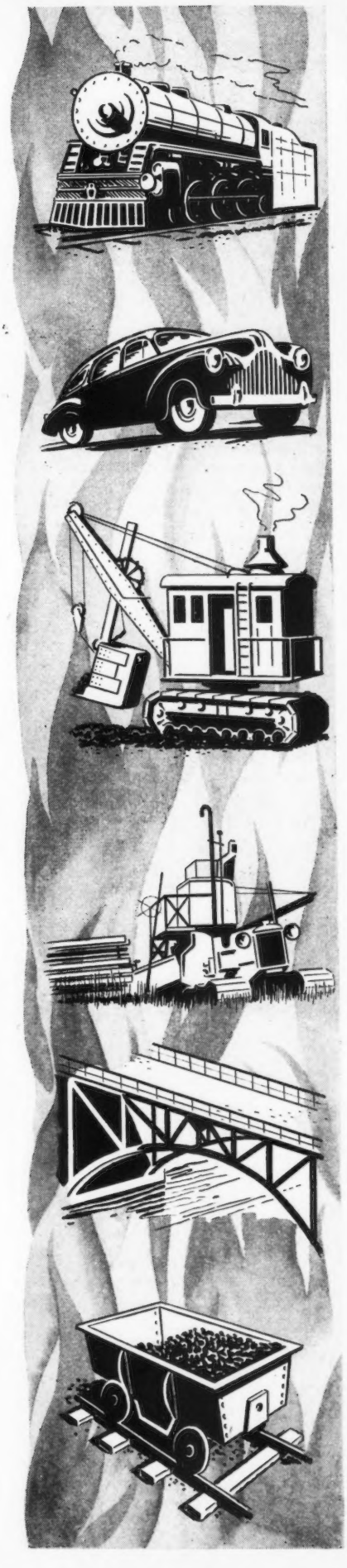
In five years almost as much real wealth was produced and destroyed as in the entire previous history of the United States. This fact is conveniently forgotten, but the implacable workings of economics demand payment in living standards. The past two-year inflationary destruction of money savings, trusts, endowments, fixed incomes, and the like, are the result of commercial bank absorption of government war bonds and subsequent monetizing of such bonds through the Federal Reserve system. This unfair form of invisible taxation has already paid for a good portion of the war.

As for the new role of world leadership: it means far more than figures in a budget. It represents drains on living standards to the tune of $900 per year per family. The extra $400 million for Greece and Turkey represents more real wealth than the entire profits of the steel industry.

So, the realization had better grow that everybody must pull in their belts and acknowledge payment for the war that was won. With a few years intense effort, more and better machinery and greater productivity, overall living standards can be pushed back to prewar levels.

T. W. Lippert

How to make strong, ductile Hi-Steel *even stronger!*



Inland Hi-Steel has proved itself in applications where high strength and great workability are necessary. Not so widely known is the fact that the advantages coming from the inherent strength of Hi-Steel can be augmented by precipitation hardening, a simple and inexpensive heat treating process.

Through this heat treatment, the yield strength of Hi-Steel is readily increased 20,000 pounds per square inch, and its ultimate tensile strength 25,000 pounds per square inch, giving Hi-Steel a 250% advantage over structural grade carbon steel in yield strength, and about a 160% advantage in tensile strength. And this, while retaining remarkably high ductility and impact resistance.

Shown, are examples of results obtained by the precipitation hardening of a ¼ inch plate of Hi-Steel at 1000° and 1100° Fahrenheit for periods of 4 and 8 hours.

	1000° F.		1100° F.	
	4 hours	8 hours	4 hours	8 hours
Yield Point	84,000 psi.	80,000 psi.	75,000 psi.	72,000 psi.
Tensile Strength	94,000 psi.	88,000 psi.	82,000 psi.	79,000 psi.
Elong. in 2" (per cent)	30	30	32	34
Reduction in Area (per cent)	60	63	67	67
Charpy Impact at 75° F.	50 ft. lbs.	53 ft. lbs.	56 ft. lbs.	63 ft. lbs.
Charpy Impact at — 50° F.	22 ft. lbs.	23 ft. lbs.	54 ft. lbs.	52 ft. lbs.

With these big boosts in its yield and tensile strength, Hi-Steel can be used to trim off still more weight in reducing the operating and maintenance costs of mobile equipment and in adding to payload. This economical high strength steel in its precipitation hardened state also becomes even better adapted for use in parts subject to stress and for withstanding abrasive wear.

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► Steel companies are discovering that their reserves set up for replacement of plant equipment are wholly inadequate to replace this equipment at current prices. Replacement costs will have to come partly from current profits or from surplus funds.

► At least two automobile manufacturers appear to be set on their engineering designs for automatic transmissions. One producer sent out a request last week for quotations on parts for 7000 units monthly. The request indicated that the new transmission will go into production "very shortly."

► Experiments in welding aluminum plates over 1-in. thick by the heliarc methods are now in progress. One company is reported to have successfully welded plate 2½-in. thick by this method.

► A steel producer recently made an extensive survey in an area where a standard item of building construction was said to be in critically short supply. It was found that by adding less than 10 pct to the supply brought to that area the shortage could be corrected-an indication of how thin some shortages actually are.

► A new exhaust-driven turbine developed by Wright Aeronautical Corp. is designed to recover more than 15 pct of the horsepower normally wasted in exhaust thrust by delivering recovered power to the engine.

► Tests on new railroad draft gear have proved successful at Purdue University. The AAR is expected to approve the new design which is a weldment instead of the conventional cast steel type.

► A new heat treating practice consists of taking forgings from the hammer and quenching into a specially designed salt bath for transformation at 1125 to 1260°F. It produces a coarse pearlitic structure that is said to be highly desirable for machining. Processing costs are reported to be lower and heat given off by the forgings may supply most of the heating requirements of the salt bath. Transformation time at these temperatures is 20 to 35 min depending on the steel. A 3-sec water spray eliminates scale and no shot peening is required for cleaning.

► American officials are making some easy surplus sales in Europe. One lot of heavy rails was sold without any trouble—at about $20 a ton. The lucky buyer resold within 5 min, reportedly to a South African representative—at four times his buying price.

Ferromanganese, very scarce in Europe, was recently sold by the American zone import-export representatives to another European country at 25 pct of the going market price. Despite the fact that Germany has to import the material, 5000 tons were shipped.

► An oil pipeline will be laid from Le Havre to Paris, requiring 22,000 tons of steel but action on it will probably be delayed for some time.

► Electrified ceilings for home heating have been developed by U. S. Rubber Co. They consist of a layer of conductive rubber sandwiched between two thin plastic layers. Average five-room house heating cost is reported to be about $72 with the new thermostatically controlled installation.

► The latest war might have ended sooner if aircraft could have been built as fast as the latest jet bomber was. It required only 14 months for Glenn Martin to complete the new six-jet XB-48 from the time first engineering work was started.

► The frenzied stage in steel buying and ordering is over. Demand is still good but unreasonable backlogs have disappeared. Unfilled order backlog now matches the quotas which have been set for the second and third quarters. Most producers will have little carryover from month to month—except in sheets and strip. Normalcy is rapidly returning but steel can not be delivered yesterday.

► Mellon Institute has started experiments looking to the production of tool and alloy steels by powder metallurgy.

► Following the failure of the Moscow conference to establish a new level of industry for Germany, it is reported from Berlin that the heads of the combined Anglo-American zone are planning new level for their own zone. They will probably begin by raising the top limit for steel production to 12 million tons. This would not be designed to increase German steel output this year, nor would it be likely to affect next year's output. But it would permit reparations officials to plan their allocations work, within the limits allowed by the new level.

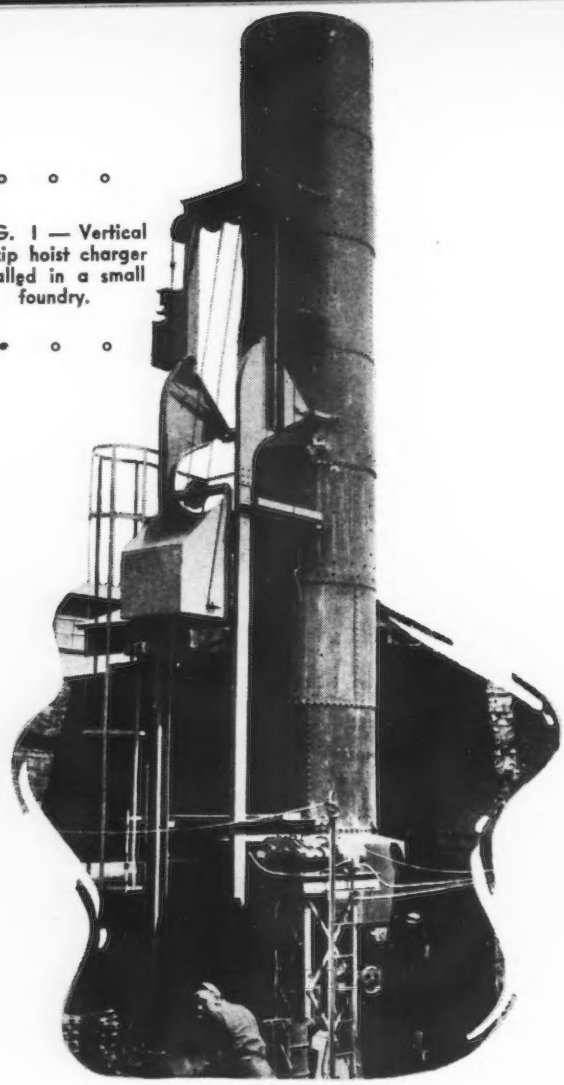


FIG. 1 — Vertical skip hoist charger installed in a small foundry.

Mechanized Melting Methods For Foundries

By A. W. GREGG

Executive Engineer, Foundry Equipment Dept., Whiting Corp., Harvey, Ill.

The current shortage and lowered productivity of labor have placed added emphasis on the importance of mechanizing melting methods in today's foundries. This article describes the latest developments in methods and equipment for the mechanization of ferrous and nonferrous melting methods and discusses the advantages and disadvantages of various types of equipment. The author also explains how mechanized melting procedures not only reduce operating costs but also improve the quality of the metal.

THE trend to mechanization of all possible foundry operations[1] received great impetus during the war years. Mechanization did not stop with the cessation of hostilities, but, on the contrary, has proceeded at an accelerated rate since VJ-Day. Many factors have contributed to this development among which the most important are perhaps the following:

[1] *See "Fifty Years of Progress" by A. W. Gregg, American Foundryman, May* 1946.

(1) The shortage of foundry workers during and since the war.
(2) The tendency on the part of labor to seek jobs entailing lighter work.
(3) Labor is not only scarce, but inefficient and high priced. For example, in the Southern states where labor was at one time inexpensive and efficient, and today is neither, many foundries are now installing mechanical charging equipment and mechanizing molding, pouring and shaking out operations.
(4) Foundries are optimistic concerning the future of the business and are anticipating a good demand for castings during the next several years. Management realizes that competition will undoubtedly be severe and that castings must meet increasingly drastic specifications.
(5) Some branches of the foundry business require increased capacity.
(6) Foundries must be made a better place to work if the best type of labor is to be attracted.

The installation of mechanized labor saving equipment in the melting departments of many foundries has lagged far behind that for molding, coremaking and cleaning departments. Only 30 pct of the foundries have installed mechanical charging equipment.

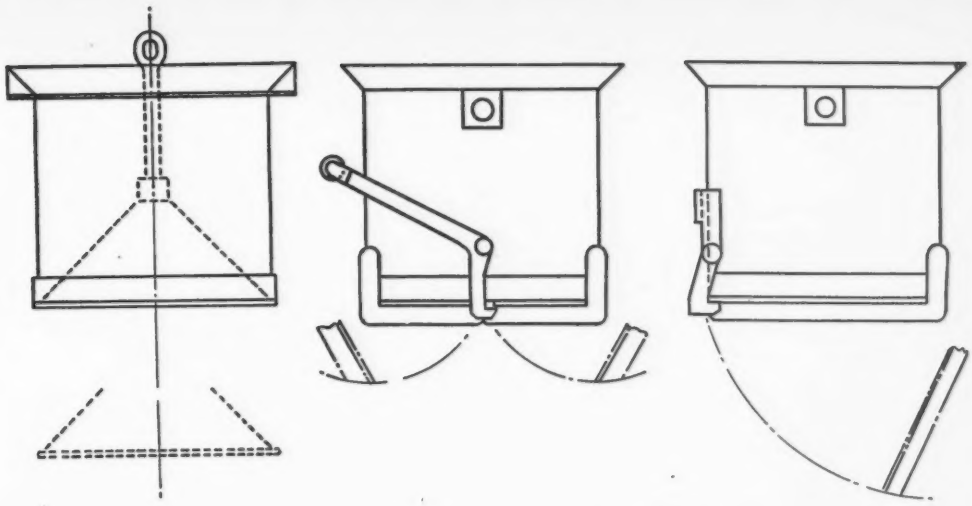


FIG. 2—Three types of charging buckets in general use. The types are cone bottom (left), double door drop (center) and single door drop bottom (right).

When war broke out, the Ordnance Dept. originally put the greatest stress on the production of steel castings and light weight non-ferrous castings, but during the latter part of the war period, cast iron and malleable iron foundries were severely taxed to meet the demand. The capacity for aluminum and magnesium castings was greatly increased, and foundries producing this type of casting were pushed to the utmost.

Developments in melting equipment in ferrous foundries to meet requirements for increased output and improved physical and chemical properties have been confined in most instances to improved auxiliary and control equipment, but great advances have also been made in melting technique.

Some 3500 gray iron foundries in this country use over 5200 cupolas which lead all other melting furnaces in tonnage produced and the number in operation. Nearly 40 pct of these cupolas are more than 20 years old.

Cupolas being built today are essentially very similar to those built in the early days of the gray iron foundry. Somewhat heavier construction is now used and steel has replaced iron for bottom plates and columns. The wind-box is now located above the tuyeres and is a tightly welded structure. Water spark suppressors are used to a limited extent, especially where the foundry is located in a residential neighborhood. Distance from base-plate to charging door has been increased, and is now usually 18 to 25 ft, with resultant economy of fuel. There is much controversy concerning tuyeres with respect to number, design and location.

Undoubtedly the greatest improvement in cupola operation is due to the introduction of mechanical charging equipment. There are many types, ranging from the vertical skip hoist serving a single cupola, and usually employed on the smaller sizes (see fig. 1), to the elaborate complete systems serving a number

FIG. 3—Coke and stone hopper, iron loading platform, yard crane with magnet makeup location.

of cupolas of any size. Three types of charging buckets, as shown in fig. 2, are in general use.

The makeup system in the stockyard usually employs a traveling crane with magnet—an iron loading platform with weigh hopper—a coke and stone bin with weigh hopper, from which these materials are fed by gravity into the charging buckets (see fig. 3). A transfer car is used to move the loaded buckets to the pick-up point under the charging crane. Instead of a traveling crane for charging as illustrated in fig. 4, some installations employ an inclined skip hoist which may serve one or more cupolas, as shown in fig. 5.

FIG. 4—Underslung crane-type charger placing charging bucket on wishbone. This installation serves four cupolas.

A completely mechanized charging installation employs from two to three men, and can handle up to 50 tons per hr. In some plants as many as 20 men have been replaced by three.

Complete mechanical charging installations not only cut labor costs but change the job from a disagreeable one to one that is safe and pleasant, requiring a minimum of manual effort. In fact, some authorities have wondered why women have not been employed to operate this equipment.

Two types of air weight control equipment are in general use and either can do a satisfactory job. Air weight control equipment is now used almost universally in cupola operation. It automatically compensates for variations in temperature and pressure of the atmosphere. Air is, of course, one of the most important materials entering the cupola and the weight of air used is equal to, or more than that of the coke, metal and flux combined with as much accuracy as is required for other materials of the charge.

Several kinds of equipment are now available for drying the blast for cupola operation. The moisture content of the air is subject to great variations. On a damp day the air required for a 50-ton melt may contain a ton of water, while on a dry day the same size melt will use a blast containing a sixth of that amount. Moisture in the air has an oxidizing action in the cupola and the foundry making light sectioned castings or chill work finds it important to keep the percentage of water to a minimum. Piston ring foundries demand a maximum of 3 grains per cu ft.

Hot blast equipment[2] is expensive and for a good many years has been considered practical only for the large foundry melting 100 tons per day and over. This was when coke was selling at $10.00 to $12.00 per ton as compared to present prices of $15.00 to $20.00 per ton.

Hot blast equipment of the type shown in fig. 6, makes possible coke savings up to 30 pct and also gives substantial improvement in control of the composition of the metal. Silicon, manganese and carbon losses are definitely reduced. Some companies report a reduction in the cost of refractories.

[2] *See also "Hot-Blast Cupola Design," by E. Longden,* THE IRON AGE, *Aug. 29, 1946.*

Several foundries today are experimenting with the use of oxygen mixed with air for cupola operation. Oxygen has proved valuable in openhearth furnace operation, but its use in the cupola is still in the experimental stage.

Steel Foundry Melting Units

The important melting units in steel foundry operation today are the openhearth furnace, the electric furnace and the side-blow converter. The openhearth furnace is economical only for large tonnages and heavy castings, and should be kept in continuous operation 24 hr a day. A recent report[3] lists 155 openhearth furnaces located in 75 foundries, of which 71 pct of these furnaces are over 20 years old and only 8 pct are under 5 years old.

Improvements in openhearth operations are due principally to improved melting technique and better control equipment. Manufacturers of refractory materials have improved their product year by year and this is especially true for basic refractories. Experiments with basic roofs are being made in several foundries, the economy of which is still to

[3] *"Special Survey of the Foundry Industry," The Foundry, March 1947.*

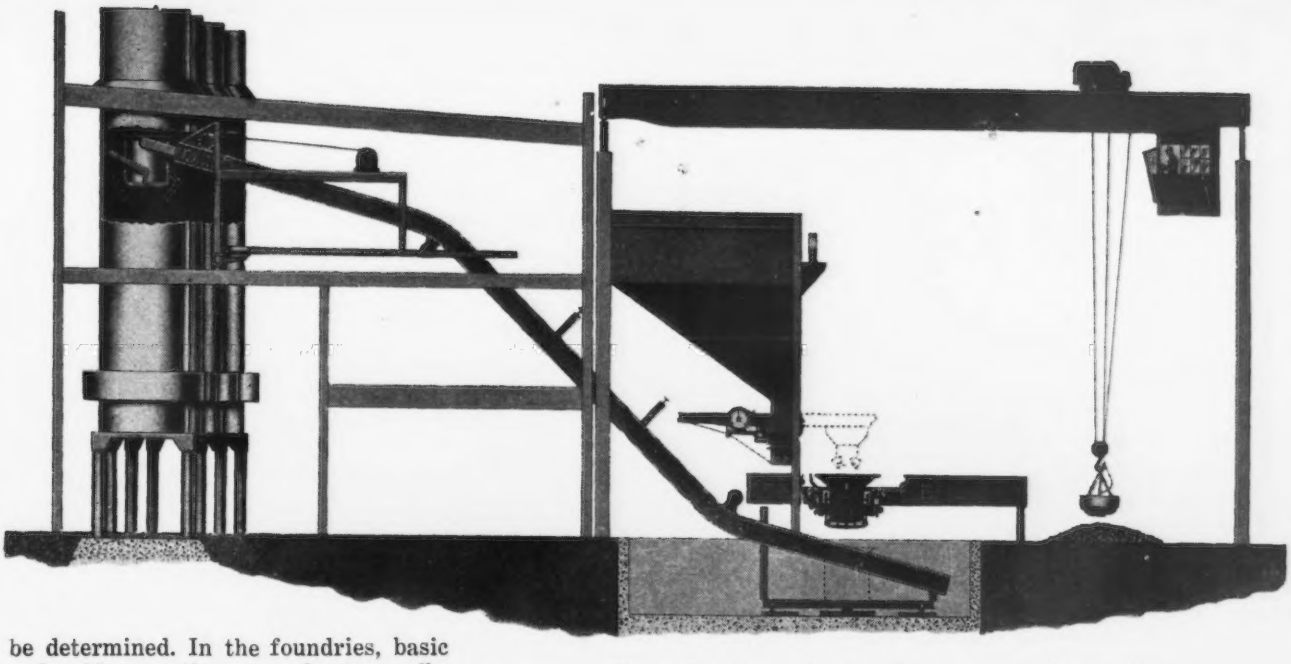


FIG. 5—Swivel-type skip hoist charger serving three cupolas.

be determined. In the foundries, basic and acid operation are about equally popular.

Pyrometers, automatic reversal equipment dependent upon temperature of checker chambers, fuel and air proportioning equipment, draft gages, fuel meters, etc., have made control of openhearth quality more certain and have replaced human judgment to a great extent. Water cooling for ports, skew backs, doors and door jambs has reduced brick maintenance, as has also the sloping back wall.

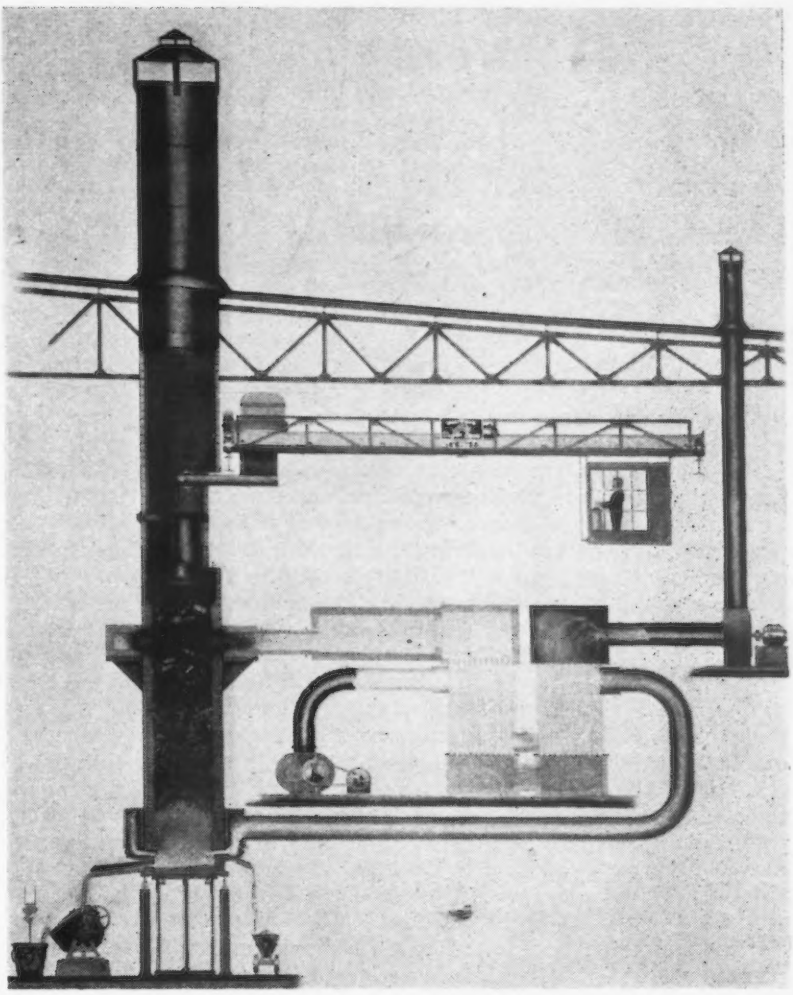
Recent experiments with oxygen indicate possibilities for greatly increased output, but a reduced price for oxygen must precede its general adoption. At present prices there is a reported increase in cost of $1.25 per ton of metal melted which must be balanced against savings due to increased output.

The electric furnace which got its big start in the foundries of this country during World War I, continued to expand its field in World War II. Recent reports show 1345 furnaces located in 587 foundries. About 38 pct of these furnaces were installed during the last 5 years. The newer furnaces show some improvement in design of the furnace itself, but actually differ very little from earlier designs except for improved control equipment, both electrical and mechanical.

Top charge furnaces have reduced the time between heats to a minimum with a consequent saving of power and an increase in production. The installation of top charge furnaces of the type shown in fig. 7, has reduced the yard labor of making up charges to a minimum as this is now accomplished with a magnet crane.

Two classes of mechanical electrode

FIG. 6—Sectional view of Griffin type hot blast cupola and blast heaters.



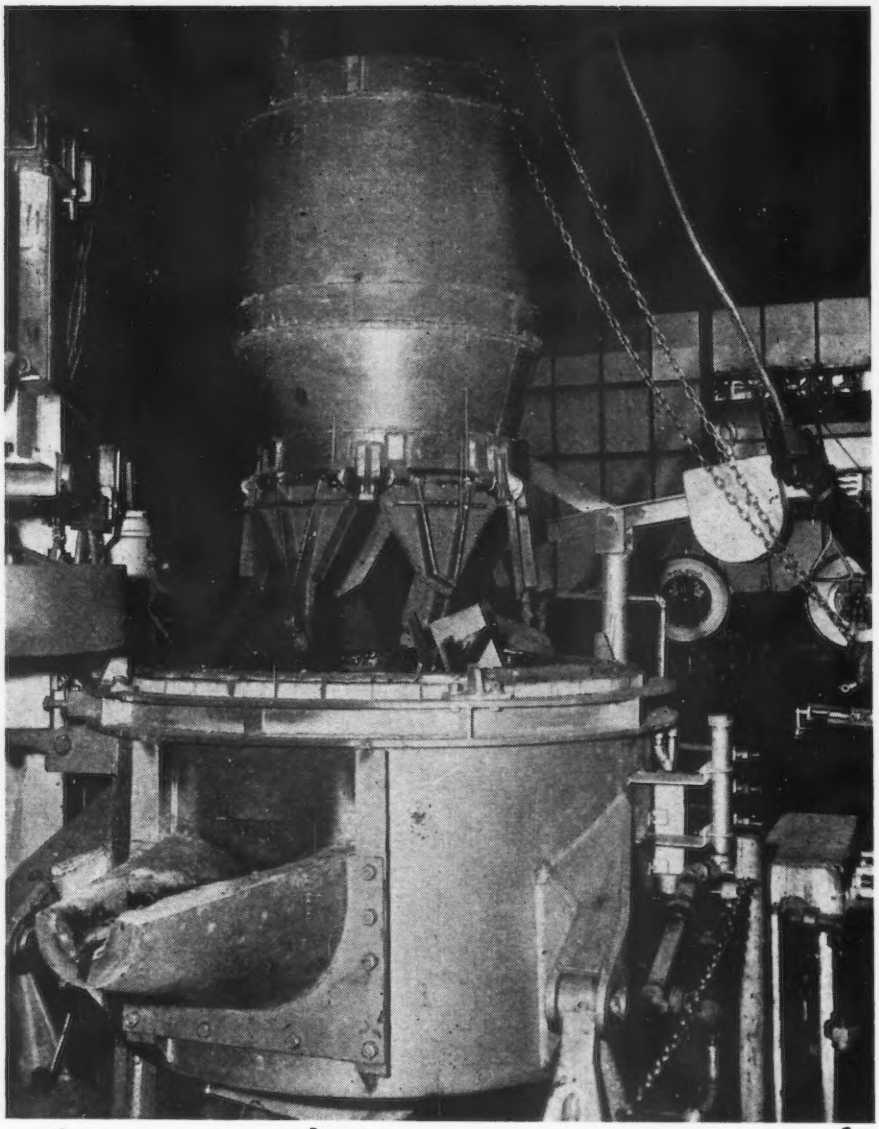


FIG. 7—Top charge electric furnace and Sivyer type charging bucket.

positioning equipment are in current use today: (1) A motor-winch steel-cable drive, wherein a steel cable is directly attached to a motor-winch drum, or a steel-cable counterbalanced drive, and (2) hydraulic control, which is a recent development and is extremely sensitive and accurate. The weight of the electrode arm and moving parts is counterbalanced with air pressure. By counterbalancing the weight of the electrode arm and the weight of the electrode parts with air pressure, a small reversing metering pump motor can be used to accomplish the actual fluid movement in adjusting the electrodes.

The most popular automatic regulation equipment at the present time is the rotating type which is sold under three different trade names by manufacturers of electrical equipment. This equipment is a generator-amplifying combination, in which rectified-electrode-arc current is balanced against rectified-arc potential in the field of a small generator for each phase. If arc-current flow is too high, the generator puts out electrode motor current in one direction. If arc-voltage is too high, the generator puts out electrode motor current in the opposite direction. The current output is always in proportion to the degree of arc off-balance for either raising or lowering the electrode.

The most recently developed automatic regulator is based on electronic control. It has no moving part and can respond in a fraction of a cycle, provided the mechanical controls can handle such a fast response without overheating or hunting. Only one installation is reported to have been made to date.

In addition to cold melt operation, the electric furnace is being used in connection with a cupola and converter for the production of steel by the so-called triplexing process, making it possible to produce steel continuously to supply a moving mold conveyor. This process has great possibilities for continuous high capacity production of steel castings and makes possible for the steel foundry the benefits of continuous molding and shake-out operations. In one foundry, as much as 340 tons of molten steel has been produced with this process in a 16 hr period, supplying metal for a continuous molding unit where molds were being poured at the rate of five and six per minute.

The electric furnace in this connection is acid operated and serves principally as a heated mixing distributing ladle. Current consumption is about 50 kw-hr per ton of metal produced.

Side-Blow Converter

The side-blow converter experienced a new lease of life during World War II. A recent report shows 52 converters in operation, located in 39 foundries. Over 40 pct of these converters are less than five years old, and 76 pct are less than 10 years old.

An important factor in the renewed interest in the side-blow converter was the development of the Jones & Laughlin electronic flame control equipment. This equipment, shown in fig. 8, catches the end point of a blow more accurately than is possible for the human eye. It also shows when a boil is about to occur thus enabling the operator to reduce the pressure of the blast before a violent reaction takes place. This has resulted in a lower blowing loss.

All side-blow and standard bottomblow bessemer converters in America are operated with an acid lining which, of course, makes the removal of phosphorus impossible as no acid process for steelmaking can remove phosphorus or sulfur. The converter process can control the sulfur content by treatment of the cupola metal with alkali slags prior to delivery of the metal to the converter.

A process developed by Yocum at the Benwood plant of the Wheeling Steel Corp., is highly successful in removing phosphorus in bessemer converter steel by

use of a ladle treatment with iron oxide, lime and fluorspar. Yocum's method leaves the metal is an oxidized condition requiring further treatment if the metal is to be used for castings. The Yocum method is more applicable for the production of ingots.

The investigation made by Sims and Dahle[4] of Battelle Memorial Institute, concerning the comparative properties of electric, openhearth and converter steels did much to dispel erroneous ideas concerning the quality of steel produced by the side-blow converter. The authors found "no evidence to favor one process over another, except that the basic openhearth furnace gave better control of phosphorus."

[4]*Sims and Dahle Report, ASTM Proceedings, May* 1942; *see also* THE IRON AGE, *July* 9, 1942, *p.* 59.

A paper presented by W. R. Jaeschke at the Chicago AFA Regional Meeting in November 1946, lists 35 foundries making malleable iron by the duplexing process, using the cupola as the prime melting unit and the air-furnace as the secondary unit. The following table shows melting methods in use in malleable foundries:

Process	Number of Installations	Air-Furnace Fuel	
		Oil	Pul. Coal
Cupola to electric furnace	4		
Cupola to air-furnace	35	3	32
Cupola to openhearth	1	1	

Probably 50 pct of all the malleable iron made in this country is now produced by the duplexing process.

Important economies are possible through the use of this process and the product readily meets the specifications for grade A malleable. A continuous supply of metal is provided and the principal saving today is in labor cost. Molders are kept molding all day, and the pouring and shake-out operations are performed by a labor crew. Greatly increased output is possible for a given floor space which represents saving in overhead expense per ton of product. When steel scrap was cheaper than pig iron, there was a considerable saving involved through the use of increased steel and decreased pig iron in the charge.

This process employs the most efficient and fastest melting unit, the cupola, in connection with the carbon reducing possibilities of the air-furnace, making it possible for malleable foundries to benefit by the use of continuous methods of molding, pouring and shaking out without any sacrifice of quality.

Metal produced by the cupola to electric furnace process is actually a closely controlled cupola malleable iron, poured through an electric furnace. If metal is produced continuously, castings will meet grade B specifications. It is possible to produce metal to grade A specifications with this process, but in this case the metal is not produced continuously, the electric furnace being operated as a batch unit.

FIG. 8—Two-ton side-blow converter operating with electronic flame control equipment. Note record of preceding blow on strip chart at left. Blast pressure is recorded on chart at right.

Nonferrous Foundries

Very few nonferrous foundries are at present mechanized. In most cases the tonnage handled is small and hand labor for charging, pouring, etc. is the almost universal practice. The single phase arc-furnace is being increasingly used for the manufacture of brass and bronze, and tilting gas or oil-fired crucible furnaces are the usual equipment for melting aluminum and magnesium.

Recent reports indicate that foundries in this country are now operating at about 80 pct of capacity. Gray iron, nonferrous and malleable iron foundries are very busy. Steel foundries are reasonably busy, but lagging a bit behind the peak demand of the war years.

The melting furnaces now installed in ferrous foundries apparently have ample capacity to supply the molten metal requirements of the molding departments, but auxiliary equipment is still needed in most shops.

▲ ▲ ▲

Quick Guide to Solutions for

Stripping Metal Overlays

By J. B. MOHLER
Cleveland Graphite Bronze Co., Cleveland

SCRAP pieces are produced in the best controlled processes. This scrap has potential value if it can be salvaged, and salvage processes often depend on a means of removing a metal deposit from a base metal.

A stripping process depends on the reactivity of the metal to be removed as well as the reactivity of the base metal. A solution must be used to which the overlay is highly reactive and to which the base metal is only slightly reactive.

Immersion methods are simple and convenient but electrolytic methods must often be used. In either method the base metal may be dissolved or pitted if the process is not carefully controlled. Stripping methods often require, for this reason, some experimentation and should be regarded with the care they require. The simple removal of zinc from steel by immersion in dilute hydrochloric acid may be done by anyone, but the removal of copper from zinc base die castings requires experience. Stripping of nickel from steel is another process that requires experience; and it is also a process where experimentation would be desirable. For instance, it is possible to strip nickel from steel by anodic treatment in cyanide solution, but it is difficult to reproduce the process. Stripping

TABLE I

Quick Guide for Selecting Stripping Solutions

This table is for use with the listing of stripping solutions given in table II. The reference numbers given below are the solution numbers of table II. For example, to strip chromium from steel, solutions 5 and 12 (from table below) may be used. The composition of solutions Nos. 5 and 12 are given in table II.

Base Metal → / Metal to be stripped ↓	Copper	Brass	Steel	Nickel	Zinc Alloy	Aluminum Alloy
Zinc	3	3	3,9,1	....	....	....
Cadmium	2,9	2,9	2,9,1	....	....	....
Tin	2,10	2,10	2,5	....	....	....
Lead	....	....	5	....	....	....
Chromium	....	3	5,3,12	3	....	21
Nickel	....	6,4	6,7,11	....	6	6
Brass	....	....	1	....	....	....
Copper	....	14	1,13,18	....	16,18,15,17	19,1
Silver	....	20	1	....	....	....
Gold	....	....	8,1	....	....	....
Platinum	....	....	22	22	....	....
Rhodium	....	23,4	23,4	23,4	....	....

TABLE II

Stripping Solutions

(See table I for method of selecting the proper solution)

Solution No.

1 Sodium cyanide 5 to 10 pct
Voltage 2 to 6

2 Hydrochloric acid 20 to 30 pct
Antimony trioxide 1 to 2 pct

3 Hydrochloric acid 5 to 15 pct
Temperature 140 to 175° F

4 Hydrochloric acid 2 to 5 pct
Voltage 2

5 Sodium hydroxide 5 to 10 pct
Voltage 2 to 6

6 Sulfuric acid 67 pct
Voltage 6 to 12
Current density 100 amp per sq ft
30 to 40 min per mil of Ni

7 Sulfuric acid 65 pct
Voltage 2
Lead cathodes
Reference: Metal Industry, Vol. 66, 102 (1945)

8 Sulfuric acid 98 pct
Temperature below 100° F
Anodic
Reference: U.S. Pat. 2,185,858

9 Ammonium nitrate 10 to 15 pct

10 Ferric chloride 6 to 8 pct
Copper sulfate 9 to 10 pct
Acetic acid 30 to 50 pct
Reactivate with hydrogen peroxide

11 Nitric acid 70 pct
Hydrochloric acid 0.1 pct
Reference: U.S. Pat. 2,200,486

12 Sodium carbonate 5 pct
Temperature 150° F
Current density 20 amp per sq ft
Reference: Metal Industry, Vol. 65, 55 (1944)

13 Chromic ac'd 35 pct
Sulfuric acid 5 pct

14 Sodium sulfide 10 to 20 pct
Sulfur 0.7 to 1.5 pct
Boil to dissolve sulfur

15 Sodium sulfide 8 pct
Sulfur 3 pct
Boil to dissolve sulfur
Temperature 185° F
Reference: Trans. Electrochem Soc. Vol. 77, 210 (1940)

16 Chromic acid 17 to 37 pct
Ratio CrO:SO 100:1
Temperature 68 to 77° F
Current density 65 to 130 amp per sq ft
Alternating current 50 to 60 cycle
Reference: Trans. Electrochem. Soc. Vol. 77, 207 (1940)

17 Sodium sulfide 10 pct
Voltage 2

18 Sodium hydroxide 9 pct
Sulfur 14 pct
Boil for 30 min to dissolve sulfur after treatment, spray treated zinc base with water to loosen the copper sulfide and dip in a sodium cyanide solution.
Reference: American Electroplaters' Soc. Conv. Proc. (1946)

19* Nitric ac'd 50 to 70 pct

20* Nitric acid 1 volume
Sulfuric acid 19 volumes
Temperature 180° F
Keep work dry entering solution.

21* Same as solution No. 18 but using anodic direct current in place of alternating current. Or an available chromium plating bath.

* Reference: W. R. Meyer, paper presented at Cleveland section, American Electroplaters' Society.

22 Hydrochloric acid 2 volumes
Nitric acid 1 volume
Water 1 volume
This solution will spontaneously decompose so that the life is short. It will also attack the base metal, but it may be used for thin deposits.

23 Molten sodium cyanide
Temperature 1100°

See also: Plating and Finishing Guidebook, 1945, p. 175, Metal Industry Publishing Co., New York. Metal Industry, 52, 1938; Metals, Finishes and Finishing Processes, THE IRON AGE, Sept. 13, 1945, p. 65.

of chromium from steel on the other hand is very simple for almost any alkaline solution will readily strip it on anodic treatment. The most convenient means in the ordinary plating line is whatever electrolytic cleaner happens to be available.

Electrolytic methods should be standardized for each case. Cyanide, for example, will remove many metals from steel electrolytically, but cyanide at high voltage can dissolve and severely pit steel. This effect can be practically eliminated by using 2 v or less, and it can be lessened at higher voltages by addition of sodium hydroxide.

A quick guide to the selection of the solution most suitable for stripping a given plate from a specific base metal is given in table I. The solutions listed in this table are arranged in order of preference, that is, the first solution listed under a given base metal is preferred, on the basis of available data, for stripping that particular plate. The makeup of the solutions listed in table I is given in table II. These tables present recommended methods, but they may also be used to select stripping solutions for experimentation where no recommendations are given.

A method that will strip a metal from steel is likely to strip the same metal from nickel with some slight modification. Chemical methods that have little effect on steel probably will not have great effect on the more noble metals. However, this cannot be depended on since the base metal is often rendered passive. If the base metal is made passive by the stripping reagent, then it must be activated before it can be replated electrolytically. This is often done by drying followed by mechanical removal of the film or by cathodic treatment in hydrochloric acid solution.

For stripping of experimental combinations of overlays it is well to consider the etching solutions used by the metallographer. Combinations of hydrogen peroxide with various acids and even with ammonia can often be used as special stripping solutions. The electrolytic polishing baths that are becoming more popular are also possible stripping baths. Concentrated sulfuric, phosphoric, chromic and acetic acids and various combinations may remove an overlay under the influence of current, and render the surface of the base metal passive. Or, if dimensions are not important, they may remove part of the base metal by electrolytic polishing and produce an acceptable surface for plating. Such baths may even be used for production salvage if they can be regenerated. (U. S. Pat. 2,348,359).

Tilting Mold Eliminates Casting Defect

AN interesting discussion of the use of risers in gray iron casting production appeared recently in the *Foundry Trade Journal*, London. The author points out that risers fulfill a number of functions in a mold, depending on the nature of the metal cast. For some castings in certain types of gray iron, risers are used simply as an indicator when the mold is full, and to enable the flowing through of a quantity of metal to ensure that any untrapped gas is driven off.

For high-duty iron risers are often necessary to feed the casting, somewhat similar to steel foundry practice. Occasionally defective castings can be traced to the use of inadequate risers, and it is essential for sound castings that risers of correct shape be used, and suitably positioned.

A particular defect once encountered by the writer, was one in which a large shrinkage cavity was found at the junction of the riser with the casting. The peculiar feature of the defect was that it was not over the whole surface but at one end, as A, in fig. 1. This job was cast in the position shown, and a self-feeding riser had been used on the boss, but unfortunately the molder did not remember that the virtue of this type of riser lies in its gravity feed. In the case under review the riser had been placed on at right angles to the boss and the job cast with the joint of the mold level—as fig. 1. Consequently there was no feeding action whatever at one end, resulting in the shrinkage cavity which scrapped the casting.

The remedy, and the practice which should always be adopted, is to cast the mold with the riser in the vertical position, even if it is necessary to tilt the mold, as in fig. 2, to accomplish it. This is also true of jobs where molding box bars sometimes interfere with the placing of the riser in the vertical position. Letting it lie to one side to avoid the bar may be satisfactory for gray iron work, when the riser is only used to flow the metal through the mold, but for high-duty iron, where the riser has to supply feed metal, this must be placed upright, even if it necessitates the breaking out of a box bar to accommodate it.

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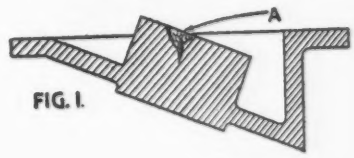

FIG. 1.

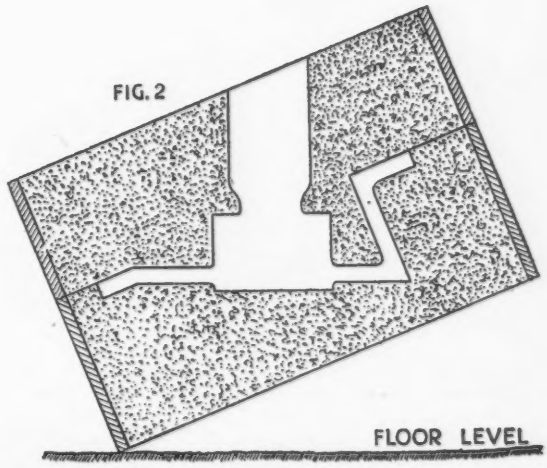

FIG. 2

FIG. 1—Welding of the stator frame is performed on a Westinghouse submerged arc welder which automatically loads, sizes, welds and unloads the parts.

Modern Motor Manufacturing Methods

Still in seriously short supply and subject to 60 week delivery, integral horsepower electric motors are, nevertheless, rolling from the conveyor lines at the new Westinghouse Buffalo plant at an almost incredible rate. How these all-steel, welded frame Life-Line motors are produced by the use of continuous automatic equipment in a new, fully conveyorized plant is described herein.

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By H. E. LINSLEY

Machine Tool Editor

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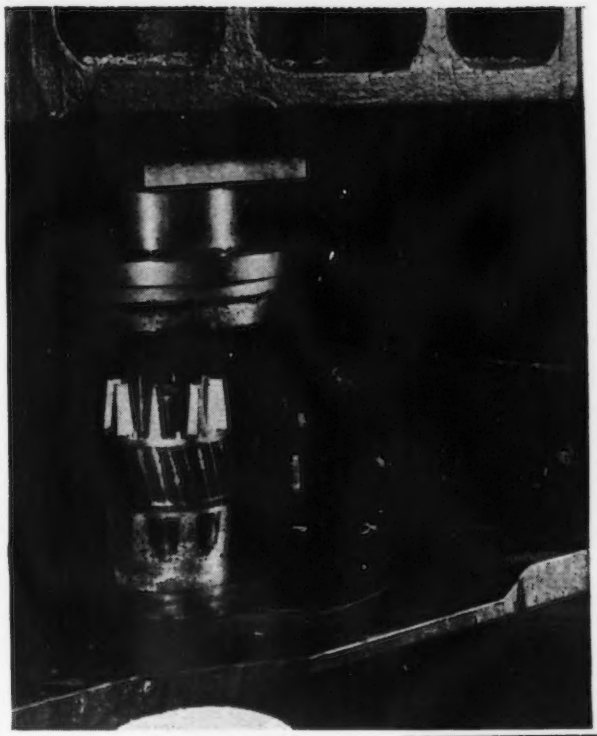
SCIENTIFICALLY planned for the quantity production of integral horsepower motors ranging from 1 to 300 hp, ac and dc, essentially for use on industrial equipment, the new Westinghouse Electric Corp.'s plant at Buffalo, N. Y., now becomes the company's second largest plant. With an area of 2,400,000 sq ft, the factory is designated as the Westinghouse Buffalo divisions, and in addition to motor manufacture will also house the divisions handling the construction of motor generator sets, magnetic brakes, rectifiers, electronic controls and motor controls. The new, automatic, submerged-arc welding machines which have been used in production for some time, and which are shortly to be placed on the market, will also be constructed in this plant, as also will a complete wire drawing and insulating setup for both round and rectangular wire for the company's own use.

Transferring the facilities from East Pittsburgh to Buffalo without interrupting production has represented a tremendous task of planning and organizing, since it has involved not merely moving existing equipment from one place to another, but also converting manufacturing processes to produce the all-steel frame Life-Line motor. So successfully has this been done, however, that during the month of March production was increased from 20,000 to 29,000 motors in both plants.

When in full operation it is expected that the factory will employ some 7000 workers, of whom about 20 pct will be women, and will do an annual business of $72 million a year. The move to Buffalo represents a part of Westinghouse's $36 million expansion program to be carried out this year, and in spite of the great size of the new plant it is planned to undertake further construction in the near future to add an additional 100,000 sq ft to the already existing floor space.

Manufacture of the steel frame motor is divided into two main sections, one for ac and one for dc, and each of these is in turn subdivided into lines handling standard, near standard, and special types. The methods employed in each division are similar, except that parts which are not standard are not processed on automatic, high production equipment, since the output is relatively small, and conventional lathes and other equipment must necessarily be used.

The stator frame is sheared from strip steel approximately 5/16-in. thick and varying in width according to the size of the motor. The operation is performed on a Niagara punch press, and at the same



ABOVE

FIG. 2 — Rotor laminations are formed into an integral unit with end plates, fan blades and balancing lugs in a single operation on a die casting machine.

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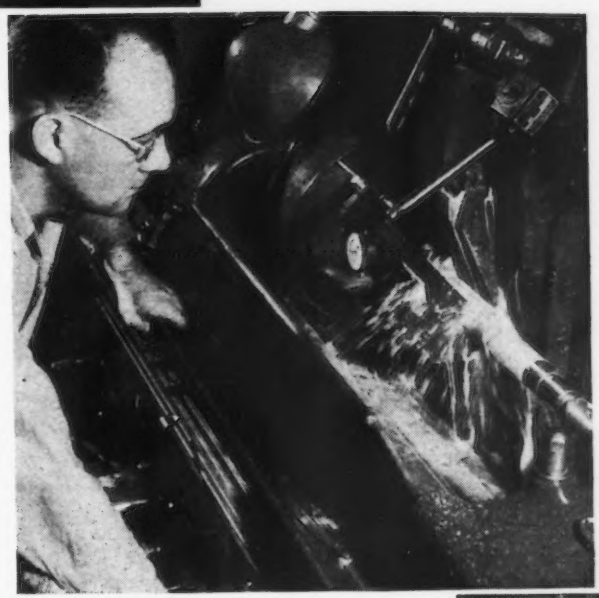
FIG. 3—As many as five different diameters may be finish ground on motor shafts on this template controlled Cincinnati grinder.



Welders are full automatic, hydraulically operated, cam controlled submerged-arc machines of Westinghouse design. The frame cylinders are loaded on to a pilot and drawn back on to the locator by a pair of hydraulically operated arms. This locator is of fixed diameter, and the workpiece is clamped against it by three air-operated clamps, one at the bottom and one at each side. The bottom clamp makes contact first, and the frame is thus held to the required final diameter. Exact ID is important, since the stator laminations are a press fit in the frame, and clamping in this manner serves to check any oversize or undersize frames. If these have been cut off too long there will be a tight butt with no room for weld metal, and if too short there will be an obviously too wide gap. In the latter case, however, the gap may be filled with a piece of steel rod and a completely satisfactory weld effected. Drum type cams control the welding sequence, including the automatic striking of the arc. Welding is carried the full length of the seam and to a small tab that is later knocked off. The part is automatically ejected as shown in fig. 1, welding flux is chipped off, and the completed rings are conveyed to the foot welders.

The foot members are saddled shaped units of pressed steel, purchased outside, and having a filler block welded into each of the four feet. These blocks are prepunched, but the holes do not extend through the material of the foot itself. The frame ring is placed on an air operated expansion arbor, locating by means of the lead wire hole. The foot member is located on four shoulder pins that engage

time an elongated hole is punched at a fixed distance from one end. The sheared strips roll along a conveyor to a Bliss coining press where the edges of the elongated hole are coined to remove burrs and form a chamfer. This is necessary to avoid sharp edges that might chafe the lead wires which pass through this opening. The die incorporates a small spring-loaded switch button controlling a solenoid operated latch which prevents operation of the press unless the workpiece is accurately located under the punch.

After coining the blanks pass to a Kane & Roach through-roll type rolling machine on which they are formed into rings. Parts are fed manually, but are ejected automatically into a V roller conveyor that discharges to the top deck of a triple-deck, double-lane conveyor and storage chute that leads to the seam welders.

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FIG. 4 — Bearing hubs are automatically welded into end brackets on this special rotary fixture used on a Westinghouse submerged arc welder.

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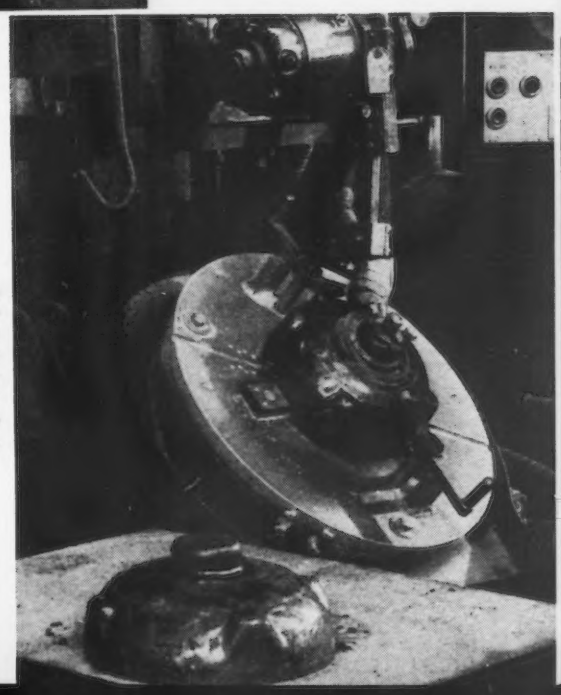

the foot holes and force the member into close contact with the ring by means of an air cylinder. The welding machines are of the same type as used for ring welding. After the seam has been made at one side the fixture is rotated 180° and the opposite side of the foot is welded to the frame ring.

The final operation consists of drilling the screw holes for attachment of the conduit box, after which the finished frames roll to storage conveyor laterals until needed for assembly of the core.

Producing Laminations

Sheet stock for the laminations is placed on a gravity conveyor and fed through a pair of 8-in. diam rolls to remove possible wrinkles, and through a pair of lubricator rolls. It is then automatically aligned and passed through the first set of roller cutters of a Bliss slitter where it is trimmed to width and slit lengthwise into strips of the required width. These strips are again aligned on a transfer table and fed through a second set of cutters, located at right angles to the first set, which slit them into squares. As the squares leave the slitter they are automatically stacked in an open-side container mounted on a lift table which lowers automatically as the height of the stack increases. Squares are produced at the rate of 500 per min, and when the container is full the lift table is at its lower position and aligned with a roller conveyor so that it can be moved to the pick-up position.

Filled containers are handled by overhead crane and placed in a storage area adjacent to a battery of punch presses to which they are delivered as occasion requires. The squares are loaded manually into automatic feeders attached to inclined bed Bliss presses operating continuously at 45 strokes per min. Slots for the stator field coils and for the special locking bars, and the center pilot hole are pierced on these presses, and as the laminations are stripped from the punch they drop down a chute and discharge to inclined belt conveyors.

As the pierced laminations drop off the end of these belts they are passed into latch type escapement feeders attached to the second-operation presses located immediately behind the first. In these presses the corners of the squares are trimmed to the required OD and the circular disk for the rotor laminations is punched out from the center. These center disks pass through the die and are collected on runner type stackers, while the outer portion, or stator laminations, are stripped on to conveyors for delivery to stacking boxes. Scrap from both rows of presses drops to underground conveyors that discharge to a hinged-pan type conveyor that in turn leads to a baling press.

Stator laminations are removed from the stacking boxes by hand, weighed into groups according to motor ratings, and each group, representing a complete stator core, wired together and stacked on a furnace tray. Approximately 20 stacks are loaded on each tray, and these are rolled to the furnace on a roller-top transfer car. The furnace is of the controlled atmosphere, pusher type, 30 ft long, and operates at 1350°F. Cores take about 12 hr to pass through the heat zone and cool to 150°F before discharge, the operation serving to relieve the punching stresses and to produce the oxide film necessary for interlamination resistance.

Full cooling of the cores takes place on the conveyor which carries them to the frame assembly press. This is a specially designed triple-action Watson-Stillman hydraulic press. A motor frame is placed over the center plug and located on the fixture. A heavy end plate for the core is then dropped over an expanding arbor and located by the lock bar slots. Over this is placed a stack of laminations, with the binding wire removed, and then a second end plate. Dummy lock pins are used on two opposite corners to align the entire core and then the arbor is expanded hydraulically to hold the entire unit. The dummy pins are removed and the upper hydraulic ram descends on the lamination stack with a 30 ton pressure. At this point the four locking pins are driven into the corner slots and then the lower ram rises to force the motor frame over the core. As the frame envelops the core a gage is slipped into the lead wire hole and held in place until its upper end contacts a limit switch, indicating that the core is properly positioned in the frame, and causing the upper ram to lift. At the same time the center arbor contracts and the lower ram lifts the assembled unit into position to be pushed on to a roller conveyor leading to a welding booth where the end plates are tack welded to the frame at four points at each end.

After tacking the frames roll to a special double-end Gisholt lathe where they are mounted on an expansion arbor passing through the center of the core. The work rotates with the arbor and the tools are advanced from each end. Each tool head carries nine tools mounted in four adjustable slides, and both ends of the frame are machined simultaneously. Operations consist of facing the ends and turning a rabbet fit for the end brackets to a 0.002-in. tolerance. The core end plates are also faced to accommodate the enclosure bells so that the same frame assembly can be used for either open or totally enclosed motors.

The final frame machining operation consists of milling and drilling the feet. This is done on a Fitchburg combination milling and drilling machine. The work is located on the rabbet and the pads on all four feet are milled with two cutters to a 0.003-in. tolerance from the centerline of the frame. The work table then rapid traverses to the drilling position where the four holes are drilled simultaneously. These holes are smaller in diameter than the punched holes in the feet pads. Completed frames then pass by conveyor to storage laterals until required for assembly of the field coils.

Building the Rotor

The flat disks punched from the center of the stator laminations are stacked on spindles and transported to a battery of Bliss punch presses where they are manually loaded into automatic feeders. On these machines a locating keyway is punched in the center hole and a series of narrow, deep, radial slots punched around the outer edge. As they are stripped from the punch, the laminations drop on to an inclined belt conveyor which carries them to a rotating stacking spindle on which they are aligned by means of the keyway. As the spindles are filled they are passed to the heat treat furnace for oxidizing in the same manner as the stator laminations.

Rotor laminations then progress to the Lake Erie die casting machine where the operator weighs out the quantity necessary for the particular size motor being built and loads them on a special arbor equipped with a key disposed on a slight helix. This arbor forms a part of a die casting mold, and when this has been assembled the unit is placed over the well of the casting machine in which a quantity of molten aluminum

has been placed. When the machine is operated aluminum is forced into the slots in the laminations, while at the same time the blower blades and balance lugs are formed. The rotor unit is then removed from the machine, fig 2, sprues are broken off, and the part rolled down a conveyor to a single spindle Edlund drill on which the center hole is reamed to a 0.0005-in. tolerance.

Following this operation the rotors are heated to 700°F in an oven to expand them sufficiently for assembly to the rotor shafts. A simple end stop is used to position the rotor and no key is necessary since the shaft will stand several tons of torque without turning in the rotor. The assembly is then placed between centers on an engine lathe and the OD of the rotor turned to size. When the parts leave the lathe an aluminum blower, heated to 650°F by an induction heater, is placed on one end of the shaft.

After cooling, the unit is checked for balance on a Dynetric balancer, the necessary corrections being made by riveting steel washers on to the cast lug projections. Finally, prelubricated, sealed ball bearings are pressed on each end of the shaft by the use of a special Westinghouse designed pneumatic press.

Shafts are produced from bar stock ranging from 1¼ to 2¾-in. diam and are cut off to approximate length on power hacksaws. According to diameter, 6 to 20 shafts are cut at one time, and these roll down a chute to a Sundstrand duplex mill where they are placed in a V type fixture and both ends are milled to length and centered. Wheeled buggies then carry the shafts to automatic Lo-Swing and Pratt & Whitney lathes where they are rough turned on centers for the pulley, bearing and rotor core diameters. Following this the keyway is milled on the pulley end on a special Brown & Sharpe automatic machine. A hopper feed is employed and the parts fed into a pneumatically operated fixture from which they are automatically ejected at the end of the machine cycle.

The OD's are then finish ground on a Cincinnati plunge cut grinder equipped with template control as shown in fig. 3. The rotor core diameter is held to a tolerance of 0.001 in., and the pulley and bearing diameters to 0.0005 in. Shafts are then burred, inspected 100 pct and passed to storage.

End brackets and hubs are drawn from heavy steel sheet and are assembled by welding. The hub is located over a pin in the center of an inclined rotary table on the welder, and is held by a nut and washer. As shown in fig 4, the bracket is placed over the hub and held by two clamps. A standard Westinghouse submerged-arc welding head is used and the operation is fully automatic. Finished units are then placed on a conveyor hook, carried through an automatic washer and dipped in a bath of primer paint. The primer dries in the 30 min required for the parts to travel 120 ft to the spray booth where they are removed from the hooks and sprayed inside with a grey finish paint which dries in 4 min.

Painted parts are placed on a belt conveyor which has a capacity of 175 pieces and which leads to a six-spindle Gridley automatic chucking machine. Movement of the conveyor is controlled by the Gridley operator by means of a push button, and when parts are needed they are readily brought up and delivered to a roller storage conveyor immediately behind the operator.

The setup on this machine is shown in fig 5. Parts are loaded at the first station, and at the second station the open end is rough faced and the rabbet fit rough turned. At the third station the bearing and shaft bores are roughed, and at the fourth station the bearing bore and rabbet fit are semifinished. The end is finish faced at the next station, and at the last station the rabbet fit is finish turned and the shaft bore semi finished.

A roller conveyor carries the parts to a Heald Bore-Matic where the shaft bore is finished and the bearing fit is bored to a tolerance of ± 0.00035 in.

Final assembly begins with the mounting of the wire coils in the stator frame. This is a manual operation and is performed on small benches surrounding a merry-go-round conveyor as shown in fig 6. At

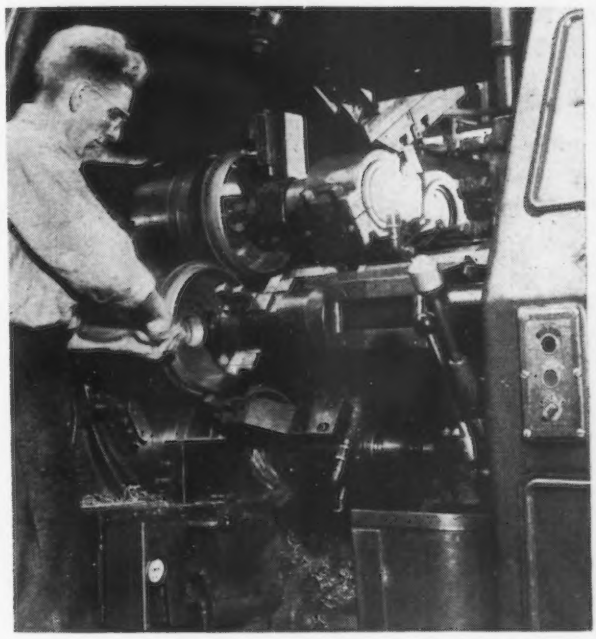

FIG. 5—All the operations for machining end brackets, except the finish boring of the shaft and bearing holes, are performed on this six-spindle Gridley automatic chucking machine.

the loading position a stator frame and all the necessary coils, insulators and wedges are placed on a tray from which they can be slid on to the bench as required. Finished assemblies are slid back on the conveyor and unloaded to a roller conveyor which carries them to the insulating ovens. Here they are given a dip in insulating varnish, baked for 6½ hr at 285°F, redipped and rebaked, and delivered to a cleaning station where the rabbet fit and stator bore are scraped and cleaned. The rotor assembly is then placed inside the frame and the two end brackets attached by four capscrews which engage tapped holes in the ends of the stator core locking pins.

Motors are given a 15 min run-in test, followed by a complete test sequence for speed, normal voltage, low voltage, normal current, low current, insulation, noisy bearings and air gap. Conduit boxes are added, rough spots sanded down, and the entire motor painted. Name plate and identification stickers are added, and the finished job delivered to the packing room for crating and shipping.

Atomic Hydrogen

By GEORGE RICHARDSON
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STAINLESS steel combustion chamber assembly for the GE type I-16 jet engine, welded by the atomic hydrogen process.

ATOMIC-HYDROGEN arcwelding, widely used in fabricating light gage sheet metal, has proven especially suited to welding the austenitic stainless sheet material assemblies for the aircraft gas turbine where straight butt, flanged butt, lap and corner joints are required.

The control of the intense heat produced by the atomic-hydrogen arc is particularly flexible, since both the arc current and voltage may be varied. The desired current for a given job is chosen by adjusting the hand crank controlling a variable reactance before welding is started. The arc voltage can be varied as desired, during the welding operation, by the trigger which controls the spacing of the tungsten electrodes. In this manner just the right amount of heat can be produced not only for the main body of the weld, but for starting and completing the weld.

It has also been found that one of the many advantages of this process in this application is that the hydrogen at the arc protects the molten pool on the top side of the joint from the atmosphere. The hot hydrogen gas also reduces most oxides present on the surfaces to be joined. This does not mean that it is not necessary or desirable, to have the parts reasonably clean before welding.

In the case of square groove and flange butt joints where 100 pct penetration is required, when welding from one side, it has been found necessary to protect the underside of the weld bead from the atmosphere by some adequate means.

Experience has indicated that when fluxes are used for this purpose, some constituents in the flux will alloy with the weld metal creating a eutectic alloy[1], which cracks when welded over at weld intersections, or during repair welding.

[1] *See "Effects of Flux in Welding Austenitic Stainless."* THE IRON AGE, *May* 1, 1947.

When this phenomeon was first noticed several years ago, considerable experimentation was carried out to provide a more suitable means of protecting the underside of the weld from the atmosphere. Tests made using hydrogen to protect the underside of the joint proved very satisfactory, and no cracking occurred in the welds when they were rewelded.

For production purposes, it was thought that a gas less explosive than hydrogen could be used. Therefore, further tests were made using helium, nitrogen, and city gas.

The results of these tests were as follows: (1) Helium proved very satisfactory for this particular application, but its cost would be prohibitive for general use. (2) The underside of welds made using nitrogen was not sufficiently protected against oxidation. (The oxidation which took place may have been due to the impurity of the nitrogen used.) (3) City gas protected the underside of the welds, but micro-examination of a cross-sectioned weld showed that a small amount of carbon pick-up had occurred. When using type 316 stainless with city gas backing, and pickled in ferrisul[2] and hydrofluoric acid, it was noted that the underside of the weld and the parent material[1] adjacent to the weld were attacked intergranularly in the area of carbon pick-up. Even in type 347 stainless, which is stabilized with columbium, the same type of corrosion took place.

[2] *This solution consists of ferrous sulfate* 18 *pct max, ferrisul* 9 *to* 12 *pct, hydrofluoric acid* 1.8 *to* 2.2 *pct.*

Welding of Stainless Sheet

Welding of stainless steel sheet for the fabrication of combustion chambers for General Electric's aircraft jet engine proved extremely difficult until hydrogen backing was used for the atomic hydrogen arcwelds. Due to the severity of the service, fluxed welds frequently failed, but no failures have been reported since the adoption of the new method. The welding technique and some of the simple but ingenious fixtures used for this purpose are described herein.

This test indicates that a gas with an appreciable carbon content is unsatisfactory for this type of application.

It was found that the most suitable medium for protecting the underside of welds made in austenitic stainless with the atomic hydrogen arc process was hydrogen, and provided proper care is taken in its use, it is not dangerous. GE has used this method for several years in fabricating of aircraft turbosupercharger and jet engine sheet metal parts, without encountering any hazards to the safety of the welding operator.

There are several ways of introducing hydrogen to the underside of the weld, and the number of types of hydrogen backing fixtures that can be used in welding with the atomic hydrogen arc process depends upon the ingenuity of the user. The hydrogen used for this purpose is usually furnished in bottle form, with each welder having his own individual supply, although on occasion as many as 12 bottles may be tied into a manifold centrally located inside the building. Pressures are usually from 3 to 5 psi, using a double reduction gage.

One of the most common fixtures used for welding longitudinal square groove butt joints is the type shown in fig. 1. With this fixture a flush butt joint can be welded using no filler material. In preparation for welding, the joint should be tack-welded approximately every 1½ in. of its length, using a carbon pencil. When tack-welding, the carbon pencil (using approximately 30 amp) is touched very lightly to the edges of the joint and drawn away. In doing so an arc of sufficient heat intensity is created to fuse the edges together. It has been found that the point of the carbon pencil should be such that it will not break off when the arc is struck and deposit carbon in the tack.

If the fixture is properly designed and this tacking procedure carried out, the joint will upset slightly when the welding heat is applied (see fig. 2). This prevents the welding heat from being carried away by the backing plate, provides slightly more parent material to be melted in making the weld, and insures a weld with a cross-section, equal to, or slightly greater than that of the sheet being welded. The welding is best done using a silent arc; that is, with the tungsten tips held close together. In doing so the heat of the arc is concentrated at the joint, and a narrow weld bead can be maintained.

No hydrogen other than that used in the torch is needed with this type of fixture, as sufficient hydrogen seeps through the joint during welding to pro-

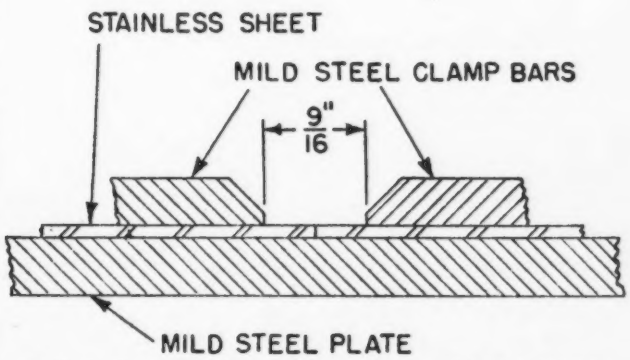
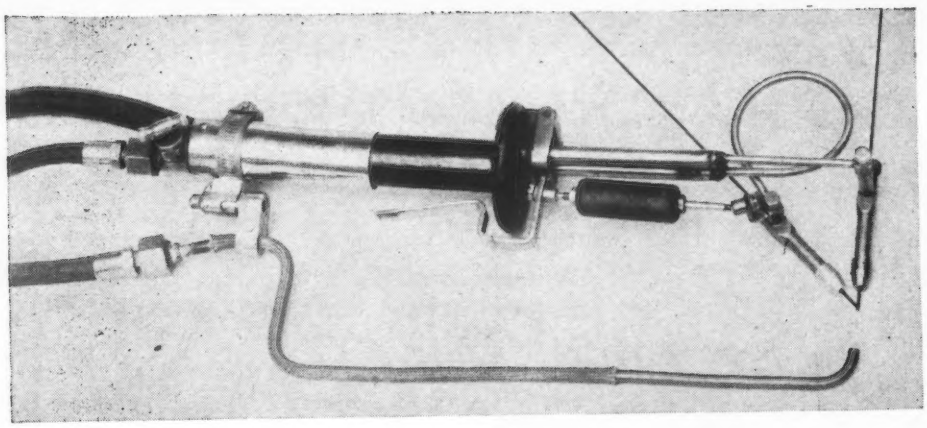


FIG. 1—Setup for atomic hydrogen welding of flush butt joints in stainless steel sheet with a flat backing plate.

FIG. 2—After tacking the joint shown in fig. 1 with a carbon pencil the joint upsets slightly, as shown here, providing more parent metal for the weld and permitting a narrow weld bead. At the same time a canal is formed for the hydrogen backing.

FIG. 3—Combustion chamber subassembly after die forming. Note that forming was done in the as-welded condition and that no grinding of the weld bead was necessary.



AT LEFT

FIG. 4—Standard atomic hydrogen welding torch with an attachment for carrying hydrogen to the underside of the joint.

o o o

BELOW

FIG. 5—Top side (left) of a flanged butt welded joint in 0.032-in. stainless made with the torch shown in fig. 4. Underside (right) of the same joint. Brightness of weld metal shows that hydrogen backing protected this from the atmosphere.

BELOW

FIG. 6—Hydrogen backing fixture used in welding the cross-over tubes in jet engine combustion chambers.

tect the underside of the weld metal. A similar type of fixture can be used in welding longitudinal flush butt joints in cylindrical parts with the same results. In this case, however, the back-up plate is replaced by a back-up pipe. This type of weld eliminates the necessity of grinding off surplus weld metal on parts which are to be die formed, or formed by spinning, and also on parts that have to be resistance welded to mating sections. Fig. 3 shows a flush-welded butt joint in a combination chamber subassembly in the as-welded condition, after die forming. Note the excellent ductility of the welded joint, and the fact that no grinding of the bead was necessary.

Where the configuration of assemblies are such that backing bars similar to that shown in fig. 1 cannot be used, a pipe can be attached to a standard atomic hydrogen torch to feed hydrogen to the underside of the joint as shown in fig. 4. A ¼-in. copper tubing is most suitable for this purpose, since it can be bent to conform to the shape of the parts being welded. The end of the tube should be adjusted so that it is in line with the tungsten points, with sufficient gap to allow the passage of the part being welded. Before starting to weld, the hydrogen flame for backing the joint should be adjusted to approximately 3 in. high. This is usually enough of a flame to protect the weld.

Fig. 5 shows the top and underside, respectively, of a welded flanged butt joint on a production part made using this attachment. It will be noted that the weld metal on both sides of the joint has a relatively bright appearance in the as-welded condition, which indicates that adequate protection during welding was achieved.

The outer combustion chamber assembly of the GE type I-16 aircraft jet engine consists of a series of ten open-end cylinders of 0.022-in. thick type 347 stainless steel, arranged in a circle and coupled to one another by cross-over tubes made from 0.032-in. thick stainless. One of the problems in welding these cross-over tubes was in obtaining a satisfactory joint between the two parts of different thickness.

In the initial stages of production of this unit, flux was used in making these welds, and a considerable number of failures occurred through the welds in service. Since these welds are subjected to considerable thermal stresses in service, a better quality weld was essential. Therefore, it was decided to use hydrogen backing. The fixture shown in fig. 6 was especially designed for this application and very successful results were obtained. The fixture clamps over the outside of the cross-over tube, and sufficient hydrogen is introduced through the two pipes shown to create a small flame around the outer edge of the fixture. Welding is done from the inside of the combustion chamber. Since the introduction of this method, no failures of the cross-over tube welds have occurred in service.

How to Use Carbide Cutters for Milling

. . . Tool Grinding and Reconditioning
. . . Selecting a Solvent
. . . Blade Setting

Effective use of carbide cutters is frequently hampered by the difficulties of properly sharpening and reconditioning the blades. This problem is fully discussed herein, and a simple and effective method is explained whereby tools can be ground to the desired angles without the use of costly equipment or highly skilled operators. Two methods of setting the blades in the holders are also described.

o o o

By H. A. FROMMELT
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o o o

ANY effective approach to the problem of making milling actually equal to its potentialities as the most effective and widely used of metal removing processes, lies in the breaking of the bottleneck of grinding and reconditioning milling cutters. This article presents a method and technique that eliminates costly equipment, and time-consuming and expensive skill, and makes it possible for the smaller plant to take full advantage of milling without being thwarted by the usual problems of grinding.

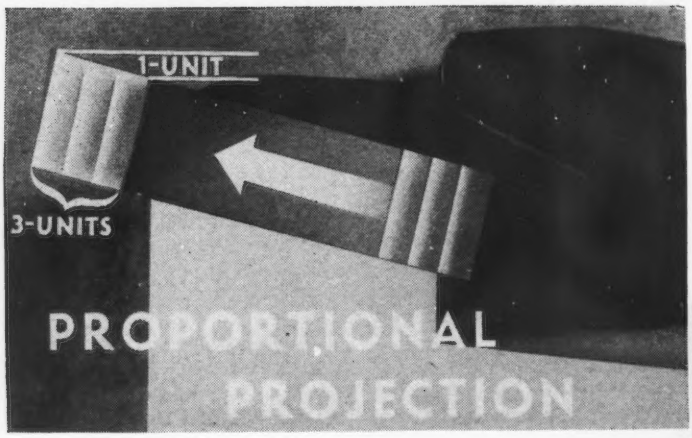
Leaving a cutter on the job too long skyrockets the cost, and the additional production obtained by continuing the milling operation is far outweighed by the added costs of putting the tool back in shape. Once the dull condition is reached, any additional use hurries the breakdown of the tool in a geometrical ratio.

Normal dullness is a condition immediately evident to the experienced eye; it is far more difficult to explain or set its limits in an exposition on paper. It is customary to advise that a carbide blade be removed for reconditioning when 0.030 in. must be ground off the OD and the customary one third of this off the face in order to restore its usefulness.

This wear on the OD of three times that on the face is typical of milling, and is logically explained by the very nature of this method of removing metal. The workpiece is fed into the cutter, placing the greatest burden of shearing the chip from the parent block on the blade OD, and leaving the job of finishing the surface to the face. This latter is a relatively light operation resulting in proportionately light wear. Hence, a normally worn or dulled cutter is reconditioned by grinding three times as much carbide off the OD as off the face.

A number of considerations concerning cutter design influence the economical use of carbide as the solid blades are ground and reconditioned. Fig. 63 shows the proportional projection obtained when the blade is set on a 15° dish angle. As this carbide blade is adjusted outward to compensate for wear, three units move outward along the OD while only one unit comes upward on the face. And since three units of carbide, say 0.30 in., are to be removed in grinding from the OD and only one unit, 0.010 in., from the face, this feature of the design makes for the most economical use of the solid carbide bit or blade.

As is evident from an examination of fig.12 (part 2, Feb. 20), this design of face mill is most efficiently ground by treating each blade as a separate unit much as a single point tool. The blades are removable, can be ground in a jig or fixture, and replaced on the machine or in a fixture designed for that purpose. However, for various reasons, it may not be possible or considered advisable to grind in this fashion; it may be necessary therefore to grind



LEFT

FIG. 63—Feeding the blade radially outward to compensate for wear necessitates the removal of three units on the OD for only one unit on the face.

o o o

BELOW

FIG. 64—Cutter and wheel setup for grinding the relief angle when blades are not removed from the cutter body.

these blades, while assembled in the body, on a standard cutter grinder. Both these techniques will be briefly described beginning with the latter, namely, the reconditioning of the cutter as a unit on a cutter grinder.

Conventional Grinding

Assuming the blades are dulled and ready for grinding, the first step is the adjustment of the blades to permit removal of the stock and still have sufficient overhang, that is, approximately 0.30 in. This is necessary after every second or third grind depending on how long the cutters have been run and how worn they are.

The relief angle is now ground off as shown in fig. 64. The cutter is set on the spindle of the cutter grinder as shown in the proper relationship to the diamond wheel so that the secondary relief angle is ground into the OD.

The primary relief angle of 7° is now ground on the blade OD. This angle is properly referred to as the clearance angle. Following this the cutter is turned into position for grinding the K-land. For steel, this is 7° as indicated in fig. 65.

Each of these grinding passes is made at a depth not to exceed 0.0005 in. Heavier cuts with diamond wheel may damage the carbide by localized overheating, the resulting thermal shock checking and cracking the blade. Craze marks may result from this bad practice and these are the beginnings of failures in the tips and blades.

The next step is the grinding of the face cutting angle which is made up of a dish angle and a clearance angle away from the cutting edge. In cutters of this design a zero dish angle is used, that is, the cutting face of the carbide, along the cutting edge makes a zero angle with the horizontal or is parallel with the finished workpiece face.

The clearance angle on the face for straight carbon steels, unless otherwise specified, is 7°. For the very low Brinell steels, wrought iron and the stainless steels a 15° face clearance angle is not only recommended but is laid down as absolutely necessary for good milling results.

To properly grind this angle it is necessary to adjust the cutter as shown in fig. 66 to eliminate the positive radial blade setting angle of 15°. Unless this is done, the dish angle, instead of being zero, is likely to be as much as 1 or 2° away from zero in either direction—either as a positive or a negative dish angle.

Once the positive radial rake blade setting angle is eliminated by revolving the cutter body as shown in fig. 66 so that the centering arm brings the blade into a horizontal position, then the zero dish angle can be ground by setting the head at the zero point on the dial.

The length of the zero line must be sufficient to cover over the feed marks made in one revolution. That is, if the chip load is 0.010 in. and an 8-in., eight-tooth cutter is being used, then the feed marks for one revolution will cover a distance of 0.080 in. Hence it is necessary that this zero dish line be ground back from the point, or toe, a distance at least equal to 0.080 in. To be safe it should be ground 0.100 in. If so ground, then the high blade will sweep over the workpiece face that is being milled much as a single point tool, and serve thus to clean up the face and mill the surface to a 20 to 30 microinch condition.

A 220 grit diamond wheel is suggested. It should

be a peripheral wheel and used only on the periphery. Using the face of the wheel results in a surface contact and this in turn causes localized heating of the blade or tip. The width of the cutting face of the periphery should be ⅜ in. and the wheel should be run at 6000 sfm for good results.

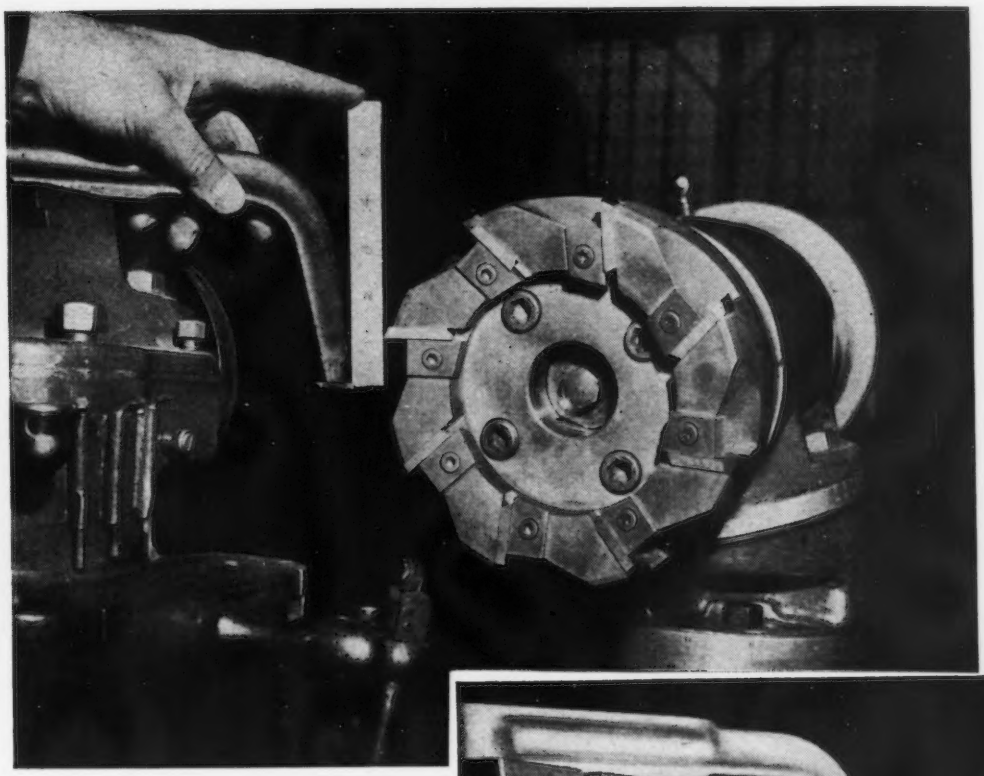
Above all, this technique of grinding demands the use of solvent, sometimes, but improperly referred to as a coolant. This solvent should be applied by means of a wick. Kerosene is recommended as the most effective and the least expensive. However, if its odor and occasional effects upon operators who are allergic to such materials are objectionable, then commercial solvents from which these disadvantages have been removed should be used. Water is also usable but its effect on the ways and other precision parts of the grinder prohibits its application. The important point is that grinding must be performed *wet* and not dry; a dry operation leads quickly to a loaded wheel.

A comment comparing the grinding of solid carbide cutters with the brazed tip, wedged shank design is justified at this juncture. The latter design requires the snagging of the steel shank, usually performed on a silicon carbide or green wheel. With the steel removed, the carbide tip is then ground in much the same fashion as described for the solid carbide blade design with the blades all set in the cutter body and the entire assembly ground as a unit. The disadvantages of this construction of the steel shank and tip are many, even in the grinding. Such a tip can be used for approximately 25 grinds and then the entire shank must be replaced.

Previous articles in this series covering carbide milling were as follows:

Part No.	Subject	Issue Date
1	Fundamentals of carbide milling	Feb. 13, 1947
2	Low carbon steel and wrought iron	Feb. 20, 1947
3	Straight carbon and cast steel	Feb. 27, 1947
4	Heat-treated steels	Mar. 6, 1947
5	Armor plate, heat-treated alloy steel, stress proof steel, die plates	Mar. 13, 1947
6	Stainless steels	Mar. 20, 1947
7	Semisteel, Ni-Resist, alloy cast iron	Mar. 27, 1947
8	Factors governing cutter life, selecting feed rates	Apr. 10, 1947
9	Regulating life between grinds, cutter design	Apr. 17, 1947
10	Factors involved in good practice	Apr. 24, 1947

The cutter shown in fig. 12 (part 2, Feb. 20) is of the precision body design using solid carbide blades mechanically held. The blades used in this technique and in this type of precision tool holder construction are ground in a grinding block or jig as shown in fig. 7 (part 1, Feb. 13). All the cutting and clearance angles are built into this jig so that with the solid



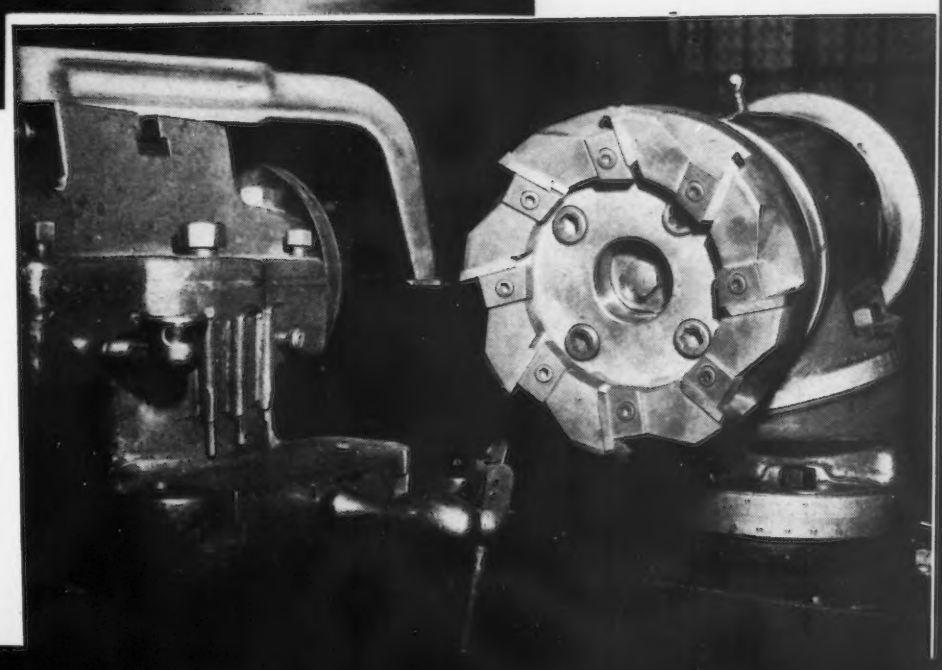
LEFT

FIG. 66—Method of adjusting the cutter to eliminate the effect of the 15° radial blade setting angle when setting up to grind the face clearance angle.

o o o

BELOW

FIG. 65—Setup for grinding the K land to the required 7° angle.



carbide blades properly inserted in the slot of jig, the angles are correctly ground by a simple operation on a very simple and inexpensive surface grinder. The jig has four faces which represent the four grinding operations, their sequence and the proper angles to be obtained by using the jig in this numerical order.

Thus setting the jig on face No. 1, with the blade properly inserted, brings the blade into proper relationship with the diamond wheel so that the OD clearance angles can be ground. Face No. 1 is the position of the jig for the grinding of the peripheral relief land. By resting the jig. on face No. 1 the blade is brought into position for the grinding of this relief angle with no dial, head or spindle setting

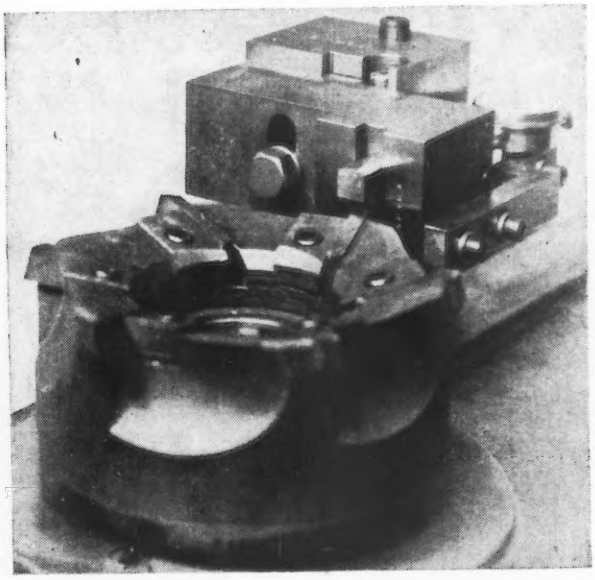


FIG. 67—Method of setting the blades in the cutter body when production requirements prohibit adjusting these with the cutter body in place on the machine.

necessary by the operator. Moreover, the operation is performed on a surface grinder having a short table travel. This grinding operation can be performed in a comparatively short time, much shorter than that required by any other method.

Setting the jig on face No. 2 will bring the blade into position for grinding the peripheral or OD clearance angle, while face No. 3 will produce the radial rake angle or cutting land. According to the material being cut, this will be 7° negative for steel, 10° positive for cast iron, and 15° positive for nonferrous materials. This latter is the same as the blade setting angle and hence no land is actually ground on the blade for these materials. The width of this cutting land should be at least 1½ times the chip thickness. Thus if a chip load or thickness of 0.010 in. is being milled, then the cutting land must be at least 0.015 in. For practical purposes and ease of control, it is considered sufficient to grind this K-land (cutting land) 0.020 to 0.030 in. wide. Thus all conditions of an ordinary day's run will be met.

The fourth and last operation consists of grinding the face clearance angle. This is done with the block resting on face No. 4. Here the dish and the face clearance angle are ground at one and the same time. The angle in the block permits grinding the zero dish angle and the necessary face clearance angle without a land and sharp to the cutting edge.

The face clearance angles recommended for steel are 7 and 15°. The former is used on all steels of usual specification. The exceptions are wrought iron, low carbon steels and the stainless steels. For these the 15° clearance angle on the face is a definite and positive recommendation.

The cutting edge should be broken either by hand honing with a diamond hone or, in the hands of an experienced operator, by holding against the periphery of a diamond wheel in one short light pass. It can also be done in a jig in which a 45° face is provided for that purpose. Such chamfers approximately 0.020 in. wide will increase the cutter life.

In addition a 45° corner angle is ground into the blade, particularly when an interrupted cut is being taken or where a reduction of the actual chip thickness is desired. Thus if the chip thickness is calculated at 0.010 in., it will actually be 0.007 in. thick approximately, if a 45° corner angle is included in the blade. The reason for this change in the actual as compared with the calculated chip thickness is that if the corner angle is 45° then the actual chip thickness is measured normal to the chip, while the table travel per tooth is the horizontal distance across the chip.

Reducing the chip thickness by increasing the corner angle also assists in preventing breakout of the leaving workpiece edge. This is desirable and even necessary in such operations as milling a cylinder head. Breakout of the leaving edge around the cored areas of this component cannot be tolerated since no subsequent machining operation removes such damage. (This is not true of a cylinder block where breakout around the cored cylinder areas is later removed by boring.)

A zero corner angle is sometimes necessary when milling to a shoulder specified as a 90° corner or shoulder. This is easily accomplished in this blade and body design by grinding a 75°, instead of a 90° corner angle into the blade. The resulting overhang of the blade is not in the least objectionable; such blades will not break or chip in the cut, and hence if the specifications call for such a corner angle, this design and technique permit it. Such a zero corner angle is ground into the blade using a jig with a face permitting such a grinding operation. Or the blades can be set in a protractor jig and ground offhand on a pedestal grinder. Or they can be ground by setting the entire cutter body in a cutter grinder with blades assembled. The OD of each blade is then ground in the usual manner and with the head set for this angle, namely, 15°.

The grinding of the face and dish angle clearance is accomplished by observing the folowing instructions. Since the slot bottoms are all in the same plane to within 0.0005 in. and if all blades are ground to the same height, that is, if the distance from the bottom of the blade to the face cutting angle is the same for all blades, then the cutting faces will all be in the same plane to within a reasonable runout. This obviously necessitates that in the grinding operation the diamond wheel must be brought to the same dial reading for all blades.

The only modification of this statement is as follows: If a large number of blades are ground as a set, and this should be done where continuous milling is being performed on the same job, as in production work, then the diamond wheel wear must be taken into consideration. This is done by checking the dis-

tance from the bottom of the grinding jig to the face cutting angle after 50 blades have been ground, or oftener if this seems necessary. This can be done with a micrometer or a gage made for that purpose in the form of a snap or C-type gage. The diamond wheel wear can then be compensated for by increasing the distance that the diamond wheel is fed downward into the carbide blade.

Blade Setting

There remains only the proper presentation of blade setting when using the solid carbide mechanically held type of cutter design. This can be accomplished in two widely different ways both of which have their place, application and justification.

The setting of the blades with the cutter body still on the machine was described in detail in part 3 (Feb. 27) of this series. This method is used wherever interference with production schedules is not important, as in jobbing work or the milling of small job lots of 50 to 100 pieces. Downtime on a milling machine is not so important in jobbing work, and the time required to set the blades on the machine will be offset by the advantages of this method.

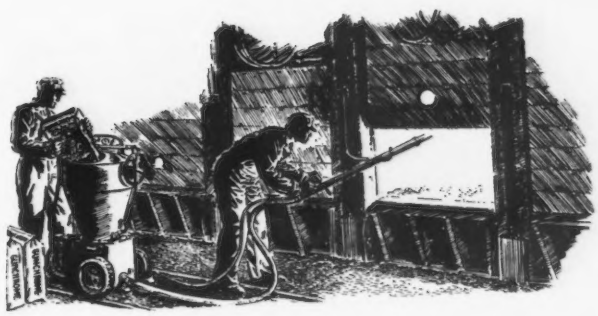
It is important, however, when using this method, to tighten all blades an equal amount by the use of a torque wrench to prevent their moving in the cut. If a 300 in. lb torque is used, the blades will not move, regardless of the load to which the cutter may be subjected.

This method of blade setting is accurate and fast, and, in addition, eliminates all runout in the spindle regardless of its amount. This is further assurance that the cutter will run smoothly, that each blade will take the same chip load as every other blade and that the cutter as a whole will run with maximum smoothness and efficiency. The lone disadvantage is the time required to perform this operation. For an 8-in. cutter approximately 10 min are required. Thus, 10 min of downtime on the machine must be debited to this method of blade setting. In a production schedule this may not be tolerable. An 8-in. cutter can be changed on a machine in something like 4 min, that is, the four spindle bolts can be removed, the cutter body taken off the spindle and another assembled and reconditioned 8-in. cutter placed on the spindle with its four spindle bolts. This saving in time may be important.

The other method of blade setting is as follows: The cutter body is set on a fixture as shown in fig. 67 having an arbor and an arrangement for bringing a positive stop close to the cutter body as shown. The blades are then set to this positive stop each one in turn starting with the first that has been given the customary 1/32 in. overhang. All blades so set will check for runout on the OD to within 0.0005 in. After the cutter has been so assembled, it is ready for mounting on the spindle of the machine without additional grinding.

Part 12 of this series on carbide milling will appear in the next issue.—Ed.

New Refractory Gun Speeds Furnace Repairs



CULMINATING 5 years of intensive investigation and testing, a new gun designed for rapid application of refractory materials to vertical and semi-vertical furnace brick walls has been developed by Basic Refractories, Inc., Cleveland. The new gun is said to permit air emplacing of refractories and to accomplish certain types of steel furnace repairs in a fraction of the time formerly required. The use of this new gun is shown in the accompanying illustration.

The new unit, known as the "B.R.I. gun," is equipped with a pressure hopper designed to hold 500 lb of refractory weighing 140 lb per cu ft, has a discharge capacity of more than 100 lb per min and automatically wets the refractory shortly before the point of discharge. An air jet sweeps the refractory from the shooting chamber through a standard 1¼ in. steel pipe. A curved pipe is available to make accessible portions of the refractory brickwork which cannot be reached with a straight pipe. The gun is equipped with valves and gages to control air feed to the hopper and the air jet. A safety valve and a relief valve provide further control of hopper pressures. The refractory chamber is mounted on a welded steel chassis which, in turn, is mounted on three rubber-tired roller bearing wheels.

Announcement of this new gun follows closely a previous announcement of a new refractory utilizing Cuban chrome ore as a base. This new refractory, Gunchrome, was described in THE IRON AGE, Apr. 24, p. 130.

JAMES T. MacKENZIE, who delivered the first AFA Hoyt lecture, is congratulated by AFA president S. V. Wood. Dr. MacKenzie is chief metallurgist of American Cast Iron Pipe Co., Birmingham.

AFA Annual Meeting . . .

Detroit Meeting attracts 5000 foundrymen . . . Operating problems and new techniques discussed . . . Education Program gets underway . . . Kuniansky elected president for 1947-48.

WITH some 5000 foundry engineers and executives in attendance, the five-day annual convention of the American Foundrymen's Assn., held last week in Detroit set a new high in enthusiasm and interest. This was attested to by the overflowing crowds at practically all the technical sessions.

With the industry facing a demand for its products in excess of its capacity to produce, the sessions were directed particularly to means of increasing output by utilization of the latest developments in techniques and material. The raw material problems, particularly that of coke, were also covered in the well-rounded technical program.

Perhaps the most noteworthy phase of the entire meeting was the emphasis that was placed on the development of a long range educational program for providing a steady flow of technically trained young men to the industry. This effort of the association's educational committee has culminated in the association's participation in the Foundry Educational Foundation. The aims of this foundation, which give prom-

AFA 1947 Award Winners

Joseph E. Seaman Gold Medal—Awarded to Henry S. Washburn, president, Plainville Casting Co., Plainville, Conn., for "outstanding service to the association and valuable contributions to the gray iron casting industry."

John A. Penton Gold Medal—Awarded to Russell J. Allen, metallurgical engineer, Worthington Pump & Machinery Corp., Harrison, N. J., for "his earnest and unceasing contributions toward the advancement of gray iron technology."

ise of fulfilling a long felt need, are discussed later in this report.

The annual business meeting on Wednesday was high-lighted by the report of the association's president, Sheldon V. Wood, of the continued growth of AFA. Mr. Wood stated that with 38 active chapters, the association's membership was expected to reach the 10,000-mark by July. The president also voiced an appeal for wide support of the newly formed Foundry Educational Foundation.

The annual election of officers for the fiscal year beginning July, saw Bill Maloney, association secretary, casting an unanimous ballot for the following new officers:

AFA President, 1947-48—Max Kuniansky, vice-president, Lynchburg Foundry Co., Lynchburg, Va.

Vice-President, 1947-48—W. B. Wallis, president, Pittsburgh Lectromelt Furnace Corp., Pittsburgh, Pa.

Directors, 1947-50—W. J. MacNeill, general manager, G. H. R. Foundry Co., Dayton; E. N. Delahunt, superintendent, Warden King, Ltd., Montreal; A. C. Ziebell, president, Universal Foundry Co., Oshkosh, Wis.; R. H. McCarroll, chief metallurgist, Ford Motor Co., Dearborn, and John M. Robb, Jr., resident manager, Hickman, Williams Co., Inc., Philadelphia.

Participation in the annual apprentice contest returned to new high levels this year, after having suffered a set back in the war years. The first place winners of the 1947 contest, who received an award of $100 and a trip to the convention, were as follows: Patternmaking division—W. Waddicor, Brown & Sharpe Mfg. Co., Providence; gray iron molding division—F. G. Matthews, Caterpillar Tractor Co., Peoria, Ill.; steel molding division—H. Gobeille, Crucible Steel Casting Co., Cleveland; nonferrous molding division—J. Hronek, Wisconsin Aluminum Foundry Co., Manitowoc, Wis.

The first Charles Edgar Hoyt lecture, delivered at the convention by James T. MacKenzie, chief metallurgist, American Cast Iron Pipe Co., Birmingham, established an auspicious beginning for this new series of annual addresses. This lecture, formerly known as the Foundation Lecture, was entitled "The Cupola Furnace." Dr. MacKenzie's talk, which received an especially enthusiastic ovation from the large crowd of foundrymen who attended, was an instructive discussion, tinged with humor, of the evolution of the modern cupola and touched especially upon early efforts at improving the operation by altering the shape, the tuyeres, stack height, and properties of the air blast. Many of the aspects of cupola operation covered by the lecturer were especially appropriate in view of the current raw material supply problems and efforts to enrich the blast.

High among the nontechnical features of the meeting were addresses by George T. Christopher, president and general manager, Packard Motor Car Co., and John H. Van Deventer, director of Information, Committee on Economic Development. Mr. Christopher's subject was "Why the Importance of the Foundry Industry," and Mr. Van Deventer, who spoke at the annual alumni dinner, discussed, "Broadening Our Economic Horizons."

The annual presentation of awards was made, as customarily, at the banquet on Thursday evening. The principal speaker at the dinner was A. H. Motley, president, Parade Publications, Inc.

The association's efforts to encourage young, technically trained engineering students to enter the foundry industry is expected to bear new fruit as the newly formed Foundry Educational Foundation gets under way. The important role which this new foun-

Peter L. Simpson Gold Medal—Awarded to Richard A. Flinn, Jr., metallurgist, American Brake Shoe Co., Mahwah, N. J., for "outstanding work in the past year in the field of chilled and white iron castings."

W. H. McFadden Gold Medal—Awarded to Harry M. St. John, superintendent, brass foundry and forge shop, Crane Co., Chicago, for "outstanding work in the field of nonferrous casting research over a period of many years."

Honorary Life Membership in AFA—Awarded to John Greenan, foundry instructor, University of Michigan, for "long service to the association, collaboration in technical papers of value to the industry, and for constantly encouraging young men to enter the industry."

dation can play in attracting engineering talents to the foundries was a much discussed subject at the convention. The foundation, an outgrowth of two years of study by the joint Ferrous Foundry Educational Committee, is a nonprofit corporation, organized and supported jointly by the American Foundrymen's Assn., the Gray Iron Founders' Society and the Malleable Founders' Society.

The purposes of the educational foundation are fourfold:

(1) Aiding five geographically well-distributed American engineering colleges to develop and arrange basic courses of study to prepare young men for the foundry industry.
(2) Assisting these colleges in procuring required foundry equipment.
(3) Establishing foundry industry scholarships at these five colleges.
(4) Encouraging promising young men to enter these special courses of engineering training for entrance into the foundry industry.

The engineering colleges which will offer these special new courses beginning with the fall term of 1947 are Case School of Applied Science, Cleveland; Cornell University, Ithaca, N. Y.; Massachusetts Institute of Technology, Cambridge, Mass.; University of Cincinnati, Cincinnati, and University of Wisconsin, Madison, Wis.

The foundation is now embarking upon a campaign to raise funds to support its activities. It is estimated that the sum of $280,000 will be needed to assure the start of the new courses this fall and to finance 50 scholarships to be granted by the foundation each year for the next 3 years.

Discussing the financial campaign, the foundation has pointed out that since it costs $100 to put a workman in a foundry, a contribution of $1 per employee per year for 3 years by foundries will represent a very modest investment in the future of the industry. The trustees have reported that a number of foundries have made contributions on this basis.

The trustees of the foundation are B. D. Claffey, General Malleable Corp.; R. W. Crannell, Lehigh Foundries, Inc.; A. Haswell, Dayton Malleable Iron Co.; J. M. Price, Ferro Machine & Foundry Inc.; P. Rentschler, Hamilton Foundry & Machine Co.; F. Sefing, International Nickel Co.; J. H. Smith, Central Foundry Div., General Motors Corp., and S. C. Wasson, National Malleable & Steel Castings Co. The temporary headquarters of the foundation is at 1010 Public Square Building, Cleveland.

The meeting's technical sessions were devoted to a wide variety of current and long term operating problems and also covered several new developments in casting techniques. The round table luncheons and the shop courses continue to be very popular with foundrymen attending these annual conventions. A complete program of the technical papers presented at the meeting was published in THE IRON AGE, Apr. 24, 1947. Information with respect to obtaining copies of the technical papers may be obtained from the American Foundrymen's Assn., 222 W. Adams Street, Chicago 6.

Space limitations unfortunately do not permit discussing here all the excellent papers presented at the meeting. However, abstracts of several interesting papers are published herewith.

New Magnesium Gating Method

The light metals, one of the most active sections of the association, were discussed in numerous papers and committee meetings. An interesting paper in that group was "A New Gating Technique for Magnesium Alloy Castings," by H. E. Elliott and J. G. Mezoff, Magnesium Laboratories, Dow Chemical Co., Midland, Mich. The authors pointed out that in the past the need for avoiding turbulance in the pouring of magnesium alloy castings has demanded the use of some form of bottom gating for a majority of parts produced in these alloys. However, while bottom gating has proved effective in minimizing turbulence, it also sets up basically undesirable conditions for controlled directional solidification. For this latter reason bottom gating tends to increase the difficulty of chilling and risering castings to soundness.

The gating method described in the paper was said to make it possible to pour magnesium alloys into molds without flowing large amounts of metal through the lower portions of the casting cavity. It was found, according to the authors, that freedom from radiographically visible microporosity is achieved more economically with this new gating technique than with conventional gating methods.

Basic features of the new gating system are shown in fig. 1, and include a slot gate (*A*, fig. 1) which continuously connects the casting with the well, *B*, as in conventional side gating. An annular screen, *C*, placed concentric with the well, *B*, consists of a cylinder of tinned steel skim gate, commonly used in magnesium alloy casting for filtering the metal. This cylinder is located at each end by cores placed, as sketched, in the drag and in the cope-cheek parting. A quantity of coarse steel wool is placed loosely inside the annular screen.

The top end of the annular screen is located by the core *D* in the cope-cheek parting and through this core there is an orifice, *E*. The metal enters the mold through the sprue, *F*, flows through the runner, *G*, to the orifice, *E*, then drops through the annular screen containing the steel wool, and flows through the slot gate into the casting.

With this gating system, the authors asserted, the flow of metal into the casting cavity is so controlled as to set up favorable thermal conditions for controlled directional solidification. The last metal poured, the hottest metal, comes to rest in the top risers, with little flow of metal through the lower portions of the casting cavity during the filling of the mold.

The annular screen serves to filter out any reaction product skins which may form as the metal drops through the orifice. Fracture tests of a number of castings gated by this method were said to indicate that the filtering action is effective in preventing the films or oxides from entering the casting cavity. The authors reported that this gating had been successfully applied to production work, including a large number of aircraft quality castings.

Coke Quality Problems

Coke quality, one of the industry's major raw material problems, came up for considerable discussion at the meeting. The difficulties of maintaining iron quality and melting rate, despite poor quality coke, were discussed in particular details at the informal sessions of the gray iron shop course. One of the

formal papers on coke was that presented by D. E. Krause and H. W. Lownie, Jr., Battelle Memorial Institute, entitled "Survey of Foundry Coke Characteristics." This paper was, in substance, a critical review of recent literature and some test data covering past research activities, and some suggestions as to the type of future development work which would most likely be helpful to the foundry industry.

The informal discussions on coke problems brought out the fact that some plants were meeting with a fair degree of success in substituting anthracite coal for the coke, with substitutions as high as 25 pct being reported. However, there was a lack of unanimity as to whether or not anthracite was actually an economic substitute, or whether it was simply an expedient.

Several foundry operators located in coal producing areas, which gave them a favorable price picture, were quite enthusiastic over their experiences with anthracite, claiming that they were able to obtain sufficiently hot iron, with normal coke ratios, and without using excessive amounts of limestone. It was significant, however, that these plants were medium sized shops, working one shift. Their experience was in sharp contrast with the findings of a large automotive shop in Detroit. This shop reported that it had experimented with up to 15 pct anthracite charges, but had run into so much difficulty, especially with dull iron, that it had been forced to discontinue the use of coal and was now using beehive coke to stretch out its by-product supplies.

Several large foundries reported success in utilizing beehive coke, with ratios of 10 to 1 being mentioned. It was emphasized, however, that this success was due largely to the particular type of beehive coke that was being used, and since beehive quality varied substantially from source to source, successful use of beehive hinged largely on the selection of the proper type.

The source was also apparently an important angle in anthracite use, since some grades have a tendency to shatter high in the stack and thus tend to slow down the gas velocity and build up the blast pressure. Thus cupolas blown with constant volume fans were running into pressure problems.

Some discussion was encountered in which the use of oxygen enriched blast was suggested as a means of putting more heat into the melting iron. These discussions, however, were entirely theoretically, and it was felt that oxygen use would give such a narrow melting zone that tuyere difficulties would very probably be encountered.

Hope for relief in the near future from the by-product shortage was said to be very dim and it appeared that use of beehive or anthracite as a substitute would probably continue for some time. In the meantime, it was suggested, better methods of handling coke, particularly directed toward minimizing breakage due to rehandling, and more careful charging procedures, would be helpful in obtaining maximum efficiency from available by-product supplies.

Determining Molten Metal Temperatures

Realizing the need for an accurate method of measuring the temperature of the liquid bath, the Ford Motor Co. about a year ago made a survey of instruments available for temperature determination and selected for investigation, two, a radiation type pyrometer and an immersion type thermocouple which seemed to offer considerable promise. This study, and its findings, were reported in the paper "Determination of Molten Metal Temperatures," prepared by G. Vennerholm and L. C. Tate, Ford Motor Co., Dearborn.

The radiation method was originally developed by Collins and Oseland and has been described in the technical press. While this method[1] does have several inherent disadvantages, the principle forms the basis for a self-recording radiation pyrometer which was selected as one of the instruments to be investigated. The disadvantages of the original Collins-Oseland instrument were overcome by mounting a thermopile with a Rayotube optical system close to the orifice and

[1] *This unit was described in detail in* THE IRON AGE, *Mar. 7, 1946, p. 63.*

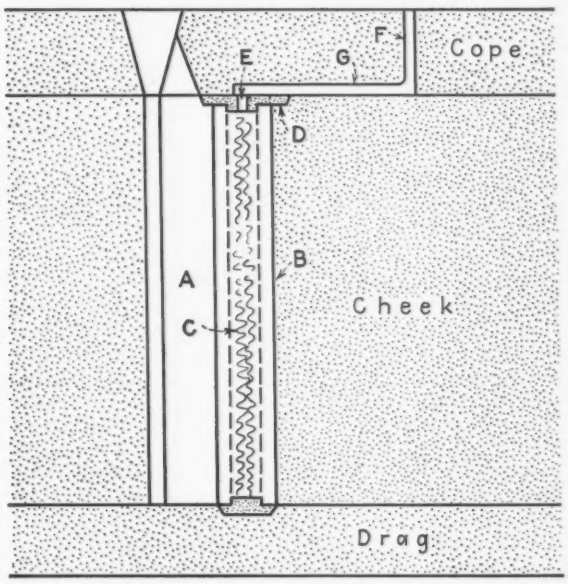


FIG. 1—Basic features of the new magnesium gating technique.

connecting it with a self-recording instrument. This makes possible automatic recording of all readings. The recording instrument is a standard Speedomax unit with a range of 1400° to 3200°F and a chart speed of 2 in. per min.

The air pressure used, the authors pointed out, plays an important part in obtaining consistent readings, and it varies with the depth of immersion. The most satisfactory results were said to be obtained with a pressure of 12 psi, with the tube immersed approximately 6 in. into the metal. The entire operation of taking a reading requires about 12 sec. The paper also described a unique method of standardizing the instrument.

The second instrument selected for the investigation was a direct reading platinum-platin-rhodium immersion thermocouple, consisting of three main parts; an angle type immersion head, an extension pipe fitted with a handle and a recorder. The instrument investigated at Ford is an adaption of the so-called quick immersion technique. In using this instrument, the power or fuel is shut off and the bath thoroughly rabbled just prior to taking the reading. The accuracy of this unit was said to be between 10° and 15° at 2900°F.

In evaluating the results of the investigation, the authors stated that both the instruments involved

form the basis for very valuable tools, when properly handled. Both types give accuracy, reliability, and ease of handling. However, both instruments possess certain disadvantages, as well as advantages, depending upon the application and requirements.

When a complete time-temperature log from meltdown to tap is desired, an instrument based on the radiation principle offers the most in that it permits frequent readings (6 to 10 min intervals) to be taken. Such an instrument requires little maintenance and there is little danger of damage when slag conditions are encountered. There are, however, certain offsetting factors, including the fact that this type unit is not standardized under operating conditions permitting slight errors to occur. However, when care is exercised such errors do not exceed 10° at 2900°F.

Where maximum flexibility is of prime importance and the instrument is to be used in the ladle as well as in the furnace, the thermocouple principle was said to permit easier handling and has the advantage in that actual temperature is recorded without requiring emissivity correction. Offsetting this, however, is the cost ($0.90 to $1.00 plus labor) of replacing the silica tube after each reading. This cost, however, must be considered in connection with the lower initial installation cost of the instrument.

The authors pointed out that while they have had no first hand experience with these units, it is planned, as an outcome of this investigation, to experiment with their usefulness in the Ford foundry in the immediate future.

Micro-Radiography of Cast Iron

A description of a new and interesting metallurgical tool was given in the paper entitled "Micro-Radiography of Gray Cast Iron," by E. I. Salkovitz, J. H. Schaum and F. W. Van Batchelder, U. S. Naval Research Laboratory, Washington. The authors described a technique in which X-rays are directed through a thin specimen to a fine grained sensitive film which is then developed and examined under high magnifications in a metallurgical microscope.

This technique was described as being especially practical for studying graphite structures in gray iron, particularly since it has promise of being well adapted to a three-dimensional study of graphite.

The equipment used in the development of this technique was ordinary industrial tungsten target X-ray tube of the type used for routine radiography. The specimens used in making the radiographs were 0.005 in. thick. The micro-radiograph slides shown with the paper were made with a 150 kv medical X-ray unit, operated at 60 kv.

In these micro-radiographs, the graphite appears black against a light background. Magnification of the spectrographic plate of up to 300X were reported. Above this point the grain of the emulsion begins to effect definition.

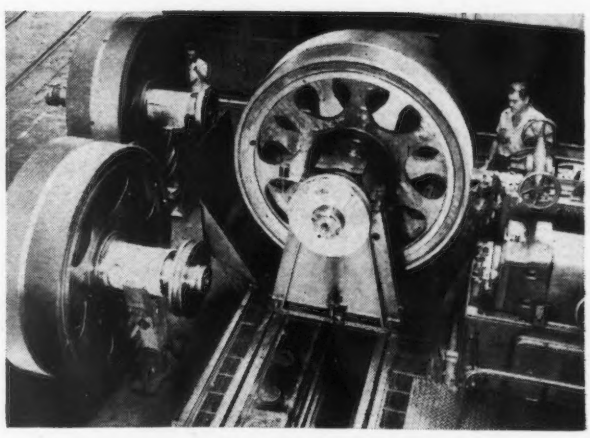
Observation of these micro-radiographs suggests some interesting aspects of graphite flake size, shape and orientation. The authors of the paper expressed the opinion that "in all instances the graphite is wider, longer and more abundant than was previously assumed from photomicrographs. The width of flakes as measured on the micro-radiographs varies from 0.0001 to 0.002 in., while the photomicrographs show a maximum width of only 0.0005 in."

The dendritic development of the matrix during solidification was shown by several of the micro-radiographs. The authors, referring to these micro-radiographs said that "since these dendrites lie at all angles in space, they are not as apparent in photomicrographs. Under the microscope, type D and E graphite appear to outline the original austenite grain but X-rays clearly reveal their consistent distribution between the arms of the dendrites. Evidently the low melting eutectic mixture is trapped in the dendritic interstices where it solidifies and rejects graphite simultaneously. The expansion of the graphite probably fills any interdendritic voids created by the shrinkage of the solidifying metal. Although all metals solidify in a dendritic system, it is not usually possible to observe the dendrites. Fortunately in gray iron, type D and E graphite are precipitated between the arms of the dendrites and when revealed by micro-radiography, serve to outline the individual dendrites. When the graphite has a random distribution, it is impossible to observe this dendritic structure."

Shaving Applied to Marine Gears

TAKING a lesson from automotive and aircraft gear manufacturers, marine gear engineers are now employing gear shaving as a method of producing a better finish on gear teeth. The 8-ft diam gears shown, in the accompanying illustration, are capable of transmitting several thousand horsepower, and are used in aircraft carriers. They are produced by Westinghouse South Philadelphia steam turbine division.

After considerable development of the shaving technique it has become possible for Westinghouse engineers to obtain full face contact without recourse to lapping or other finishing methods. Furthermore, hobbing feeds and speeds have been increased as much as 50 pct without sacrifice of accuracy but with a somewhat rougher surface that can be corrected by shaving. The resulting shaved tooth surface has about twice as fine a finish as the best hobbed surface even at slow hobbing speeds.

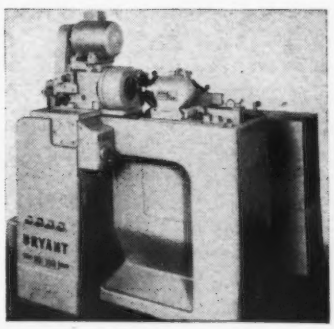


New Equipment . . .

Recent models of internal grinders, hydraulic drills and presses, thread lead testers, splash-proof motors, air-cooled transformers and hydraulic pumps are featured in this week's pages, together with a venturi gas mixer, metal coloring process, chrome refractory, floor cranes, chain hoists and wide-vision dust goggles.

Internal Grinder

AN automatic internal grinder, designated the No. 109, has been built by the *Bryant Chucking Grinder Co.*, Springfield, Vt., for high production grinding of bore



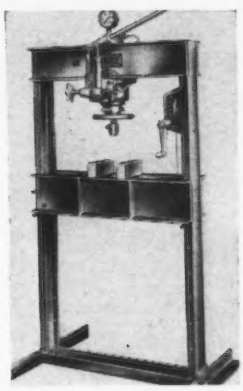
diameters from ½ to 3 in., up to 4 in. deep and will swing work up to 9 in. The grinder is suitable for such jobs as grinding ball bearing races, gears, rolls, bushings and similar parts. Hydraulic and electronic control arrangement provides for completely selective, infinitely variable cycles. As the machine operates automatically through rough grind, true wheel, finish grind and return to chucking position as finish size is reached, operator attention is required only for loading, starting and unloading. Wheel speeds up to 100,000 rpm for small bores are provided for with a direct-mounted wheelhead. A belt-driven wheelhead may be used which gives speeds from 200 to 2400 rpm.

Hydraulic Drilling Unit

A GEARLESS hydraulic drilling unit said to complete 385 holes in a gas burner simultaneously, has been developed by *Zagar Tool, Inc.*, 23880 Lakeland Blvd., Cleveland 17. The entire drilling cycle is controlled by one operating lever. A hydraulic pumping system in the base of the unit operates the motor which runs the drill-head as well as moving the ram into position. The ram feeds the casting at a predetermined rate as the drill spindles revolve and the machine shuts off after completing the drilling cycle. Drills are installed and removed with pliers.

25-Ton Hydraulic Press

KNOWN as the Model 25H, and featuring a fast-moving ram, a 25-ton hydraulic press has been marketed by the *Dake Engine Co.*, Grand Haven, Mich. The extra



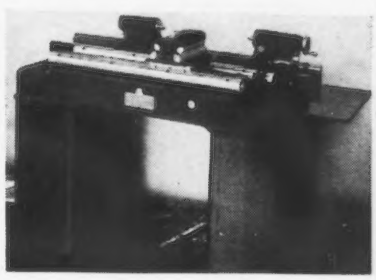
speed of operation is obtained by using an extra-large pump. Space between uprights allows handling of work up to 33½ in. in diam. Standard equipment includes two combination table and V blocks, round nose for pressing, pressure gage, and table-hoisting mechanism.

Punch Press Aligners

PAIRS of semi-elliptical plates, one concave and the other convex, with flat exterior surfaces, designed to correct errors of punch press alignment, have been marketed as Di-Ali-Ners by *Lempco Products, Inc.*, 5711 Dunham Rd., Bedford, Ohio. Each plate contains a hole large enough to clear any die-set shank and when installed with the curved surfaces facing each other, alignment is said to be corrected whether the fault lies between the press bolster and the die-holder or between the press ram and punch holder. Aligners are made of a special malleable iron analysis, machined and cadmium plated.

Lead Tester

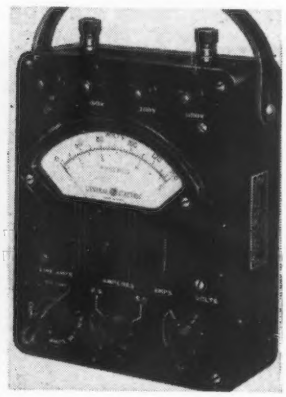
MODEL C electro-mechanical lead tester developed to check lead errors of commercial threads on a variety of sizes, has been released by *Pratt & Whitney, Div. Niles-Bement-Pond Co.*, W. Hartford 1, Conn. Workpieces with a diameter up to 10 in. and 30 in. long can be held between the tailstock centers, and work over 30 in. with a ½ to 3-in. diam can be checked using V-block work supports. Twenty-six inches of threads can be checked in one setup, it is said, and taper threads are checked in the same manner as straight threads, with no special setup. The measuring head is a standard P&W supermicrometer headstock with a 1-in. spindle travel mounted on a



special base. The spindle, graduated in increments of 0.050 in. subdivides any given inch along the work, while even inch increments are obtained by using precision end measures.

AC Load Visualizer

ANNOUNCEMENT of the AF-1 ac load visualizer, a lightweight, low-cost analyzer for use on single phase and balanced polyphase



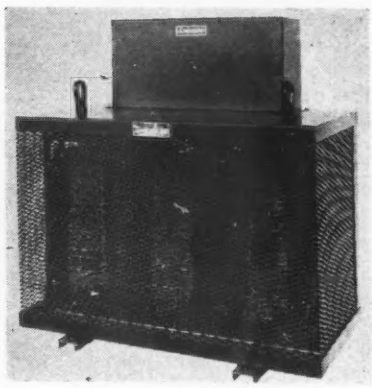
systems, has been made by the Meter and Instrument Div., *General Electric Co.*, Schenectady 5. Besides serving as a standard 0-2.5/5 amp ammeter and a 0-150/300/600 v voltmeter, this instrument can be used with the calculator furnished to determine watts, vars, volt-amperes, and power factor for load surveys, induction motor tests, reactive power studies and power-factor checks on power and lighting circuits. The load visualizer has an iron-vane moving element and separate field winding for voltage and current. Operation of the instrument is controlled by three selector knobs.

Inspection Equipment

THE BACS, a production line inspection unit for automotive crankshafts and camshafts, developed by *Magnaflux Corp.*, 5900 Northwest Highway, Chicago 31, automatically controls all operations of the inspection process. Only viewing by the inspector for Magnaflux indications of serious cracks and forging defects is required. Either circular or longitudinal magnetization is accomplished to conform to inspection requirements. The unit can be fed by two sizes of shafts simultaneously or adjusted to handle a wide range of crank sizes at various speeds. Also announced by the company is a 100 w black light used with a special Borescope for sensitive inspection of inaccessible locations and nonmagnetic braze and weld joints. Inspection takes place by viewing the fluorescent indications of defects through the Borescope carrying the small black light at its viewing head.

Air Cooled Transformers

DEVELOPED for use with electric furnaces, for testing functions, and various applications requiring heavy current, a line of air cooled transformers is being manufactured by *Lindberg Engineering Co.*, 2444 W. Hubbard St.,



Chicago. The transformers feature a built-in wiring compartment and terminal board, facilitating ease of installation. Tap switches to handle up to 500 amp are available for all units. Sizes obtainable are rated from 1 to 100 kva, up to 600 v, single phase, 3 phase, or 3 to 2 phase.

Specific Gravity Indicator

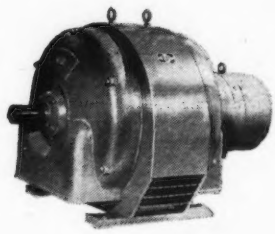
DESIGNED for continuous indication of fluid specific gravity in closed piping systems, a specific gravity tester developed by the *Fischer & Porter Co.*, Hatboro, Pa., is said to be especially adapted to distillation work and in process systems where draining of sample batches is considered hazardous. Standard construction includes carbon steel, bronze, stainless steel or Hastelloy. Needle control valves, thermometers and hydrometers are built into the unit which is constructed for heavy line strain. Accessories are available for front or rear panel mounting.

Small Multibreaker

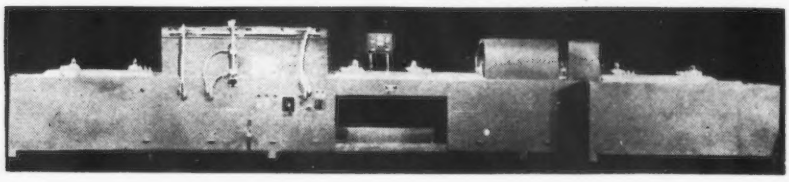
TO PROVIDE fuseless circuit breaker protection for small shops and to provide a branch circuit load center for many larger installations, the light, four pole MO-4 multibreaker has been added to the line of products manufactured by *Cutler-Hammer Inc.*, Milwaukee 1. The unit combines four breaker poles which can be used as four single pole circuits or, by inserting a simple tie rod, can be converted to one or two double pole, 3-wire solid neutral circuits. In addition to thermal overload protection, additional magnetic protection is provided as a safeguard against heavy short circuits. The unit carries a 50-amp solid main rating, with individual single poles rated at 15, 20, or 30 amp.

Electric Motors

LARGE splash-proof synchronous and squirrel cage induction motors featuring frame fabrication by welding which permits extra strength with reduced weight, and packs more horsepower into a given



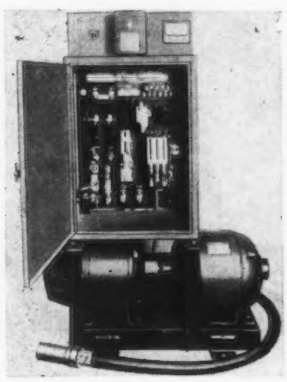
volume, have been developed by *Electrical Machinery Mfg. Co.*, Minneapolis 13. Internally, improved design and methods affect the ratio of size and weight to horsepower. The squirrel-cage winding is connected at the ends by means of phos-copper braze-welding, a method of permanizing torque characteristics. Parabolic or other curved baffles direct the air in a smoother path for reduction of turbulence and noise. Sleeve bearings employing the modern 1:1 ratio of diameter to



length are less subject to wear resulting from shaft deflection. The short bearing permits a decrease in housing size, reducing restrictions to the flow of air through the machine.

Battery Charger

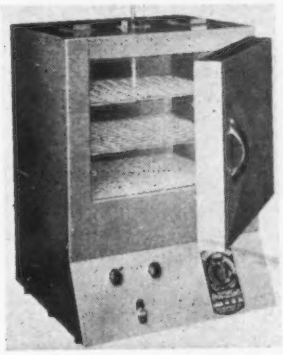
HEAVY-DUTY battery charging equipment for industrial truck service which meets the requirements of an 18-cell, 550-amp hr, lead acid type storage battery, has been announced by the *General Electric Co.*, Schenectady 5. Automatic in operation, this equipment charges the battery at the exact tapered charge rate indicated by



the battery manufacturer and is packaged into one unit consisting of a single-circuit battery charging motor-generator set, with its control cabinet mounted on welded steel framework directly above. The generator is a conventional 47-v dc machine.

Electric Laboratory Oven

FEATURING equalized heat by means of a simple double-venting device, the KH 1200 electric laboratory oven has been developed by *K. H. Huppert Co.*, 6830 Cottage Grove Ave., Chicago. The automatic hydraulic-electric temperature control featured in this furnace is said to provide control accuracy of ±1°C at any desired point within the furnace range to 420°F (220°C). The KH 1200, presenting simplicity of design, is insulated with 1⅝-in. thermo-block throughout for maximum heat retention. The oven is particularly adapted to general chemical and analytical work and for unlimited heating, drying, baking and testing. It features a stainless steel interior. Inside dimensions are 12 x 10 x 10 in. and outside measurements, 15⅜ x 21¼ x 15 in. It is equipped with two adjustable vents having



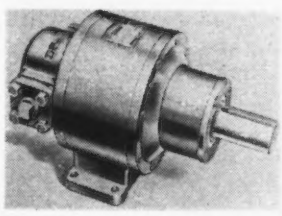
stainless slides to control exhausted air and equalize temperature inside of oven.

Overflow Valve

A THROTTLING type unloading valve, class UL, for use with steam, air or gas has been announced by *Leslie Co.*, 130 Delafield Ave., Lyndhurst, N. J. This valve is applicable wherever a throttling type regulating valve is required to maintain a constant inlet pressure by relieving the excess to a lower pressure system. A feature of the operation is smooth throttling control during the entire cycle of operation combined with quick action under sudden pressure variations. The valve is available in sizes from ½ to 4 in., for inlet pressures from 25 to 300 psi, inlet temperature to 550°F and pressure difference not less than 15 psi.

Hydraulic Pump

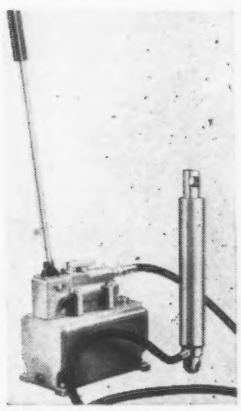
A SMALL hydraulic pump which develops 5000 psi pressure and weighs 35 lb has been developed by



the *Superdraulic Corp.*, Miller at Ford Rd., Dearborn, Mich., for applications such as a holding pump to presses and plastics injection molding machines or where hydraulic pressure application to machinery is required with minimum space. Volumetric efficiency is said to be 95 pct with the lightest hydraulic oils. A single bank of plungers delivers 3 gpm at 1800 rpm and 2 gpm at 1200 rpm. The pump has a diameter of 6 in. and is 11 in. long.

Hydraulic Hand Pump

AN aluminum housed, hand operated hydraulic pump has been announced by the *Industrial Hydraulic Corp.*, Painesville, Ohio. Both pump housing and reservoir, which is of 1-gal capacity, are cast aluminum, substantially reducing the weight of the unit. Designed for two way action, the pump is available in plunger sizes of ½, ¾,



and 15/16 in. in diam. Two models are available: Model PH3A which incorporates a 1-gal reservoir and Model PH4 consisting of pump assembly only, adaptable to applications where it is desirable to mount the reservoir at a remote plant.

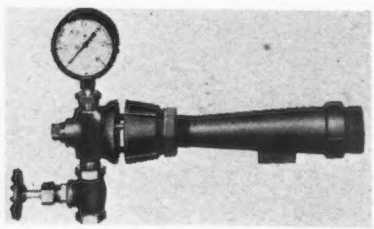
Chrome Refractory

KNOWN as Gunchrome, an air-emplaced refractory utilizing Cuban chrome ore as a base and designed to facilitate the maintenance and repair of acid or basic brick openhearth furnace interiors, is being marketed by *Basic Refractories, Inc.*, 845 Hanna Bldg., Cleveland. Development of a gun which is equipped to wet the refractory shortly before the point of discharge and which has a discharge capacity of over 100 lb per min has also been announced. The gun is light and therefore easy to transport and can be brought up close to the furnace where brick-

work is in need of repair. Only a few minutes are required to apply sufficient material to fill holes, seal cracks and restore the original contour of the brick surface. Such refractories are relatively neutral in chemical behavior and thus can be used in contact with either acid or basic refractory materials. Gunchrome is available in 100-lb bags.

Gas Mixer

PRODUCTION of a venturi mixer for high pressure gases, incorporating improved mechanical design features has been announced by the Industrial Div., *Bryant Heater Co.*, 17825 St. Clair Ave., Cleveland. Known as the Hijector, the unit uses gas under pressures up to 35 lb to entrain all the air needed for combustion, and to deliver the mixture to burners at the highest possible pressure. Overall length of the unit is substantially reduced over conventional designs,



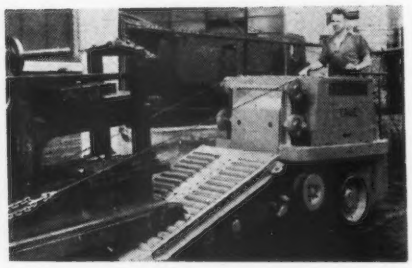
by rearrangement of the elements for ease of servicing. By reversing the usual operation of the air shutter and locating it on the body, the orifice spud is accessible for removal without disconnecting any piping. Available in pipe sizes from ¾ to 4 in., the Hijector is suitable for use with all types of gases, including liquefied petroleum types.

Metal Coloring Process

ANNOUNCEMENT by *Protective Coatings, Inc.*, Detroit 27, of an oxide coloring process for treating all types of steels has been made. This process, known as Blu-Blak, is said to color all steels to a deep, rich, blue-black, including case-hardened and cyanide hardened parts, at temperatures in the 250° to 295°F range. Parts are immersed in the bath for 15 to 60 min. Blu-Blak penetrates to a maximum depth of 0.0001 to 0.0004 in. determined by the hardness of the steel, and colors from the inside out, it is said. A Blu-Blak bath can be used indefinitely without formation of sludge, it is reported, even after continuous service for 18 months.

Tilting Platform Truck

DESIGNED for easier manipulation of massive machinery and crates into carrying position by means of an integral roller-ramp and cable-draw system, a gravity tilting platform type of electric



truck has been announced by *Yale & Towne Mfg. Co.*, Stamford, Conn. The roller platform falls into ramp position when unlatched by the operator and winch-drawn cables encircle the load to pull it onto the ramp and cause the ramp to rock back into the horizontal transporting position. When empty, the roller platform is so balanced that virtually no effort is required to rock it into the horizontal position for empty return trips.

Dust Goggle

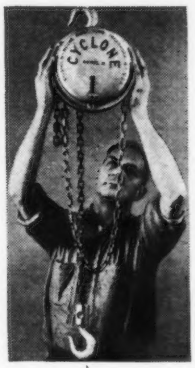
DUST elimination is accomplished with a 150 mesh wire screen set behind a 16 mesh screen on a new goggle made by the *American Optical Co.*, Southbridge, Mass., for use where fine dust particles and powder create a severe eye hazard. Wide-angle vision is provided with eyecups set deep to allow clear vision of a wide working area and the leather mask has been designed to provide a tight fit with comfort. Goggles are available with special clear lenses or in medium, dark or extra dark lense shades.

Portable Crane

A PORTABLE one-man floor crane, designed to reach out-of-the-way places where overhead conveyor systems cannot be used, has been announced by the *Hill Acme Co.*, 6400 Breakwater Ave., Cleveland. The unit is described as a four-in-one tool, which can be used as a crane, hoist, shop truck or portable ladder. Design features include welded steel construction with high-tensile drop forgings for the axle, hook and fork. The operating mechanism is a selflocking worm which automatically holds the load at any point without use of a ratchet and pawl. An eccentric axle locks the front wheels when the pulling handle is upright. The unit is available in eight sizes from 1 to 3-ton capacity.

Chain Hoist

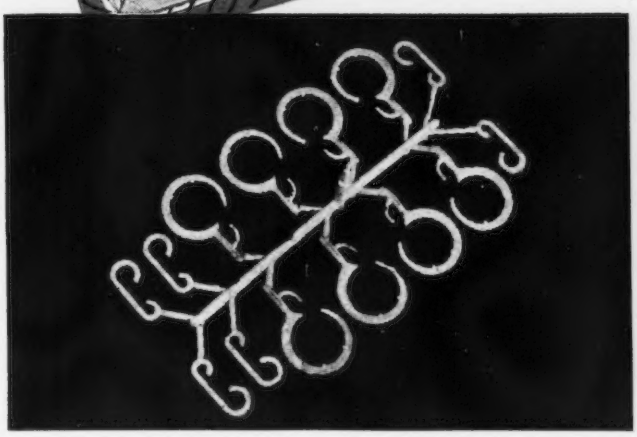
ANNOUNCEMENT of the Cyclone model M line of high-speed hand-operated chain hoists said to be 96 pct mechanically efficient and 45 pct lighter than comparable types, has been made by the *Chisholm-Moore Hoist Corp.*, Tonawanda, N. Y. Weight reduction has been accomplished through the use of steel and aluminum alloys and the design has also permitted a reduction of component parts estimated at 42 pct. Bearings are sealed for life. Redesign of lift wheel, load chain guide, gearing and load brake has reduced the pull required to unlock the brake and lower the load. Hoists of ¼, ½, 1 and 2-ton capacities are available.

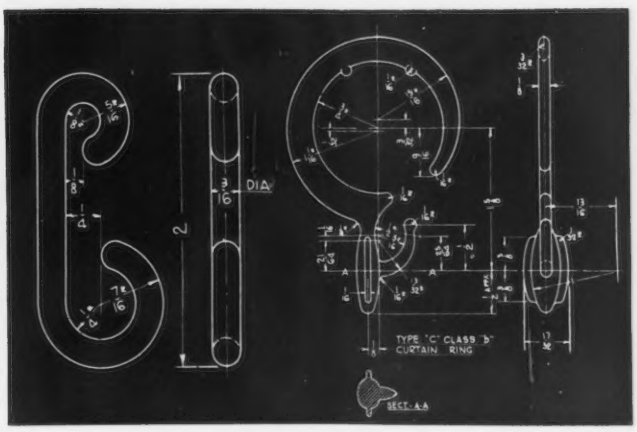


Pipe Leak Clamps

STAINLESS steel high-pressure pipe leak clamps for permanent repair of corroded high pressure oil, gas, aromatic fuel and water pipe have been designed by *Marman Products Co., Inc.*, 940 W. Redondo Blvd., Inglewood, Calif. Laminated high strength, corrosion resistant Hycar rubber pads compress into the corroded area of the pipe, when under pressure, to effect the seal. These clamps which weigh up to 6 lb fit all sizes of pipe from 2 to 8 in. and can be installed by one man, it is said.

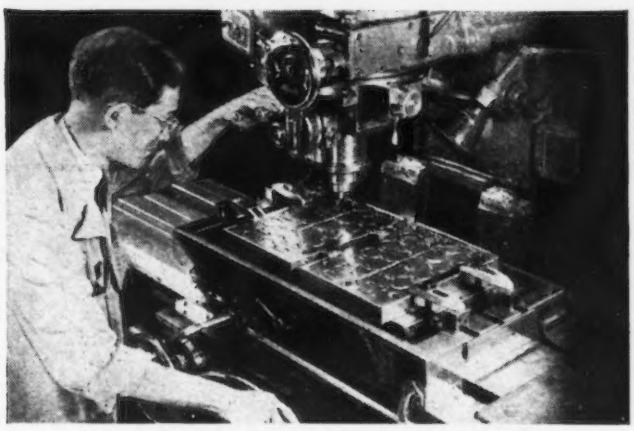
How to Layout and Mill a 14-Cavity Injection Mold — Complete in 52 Hours

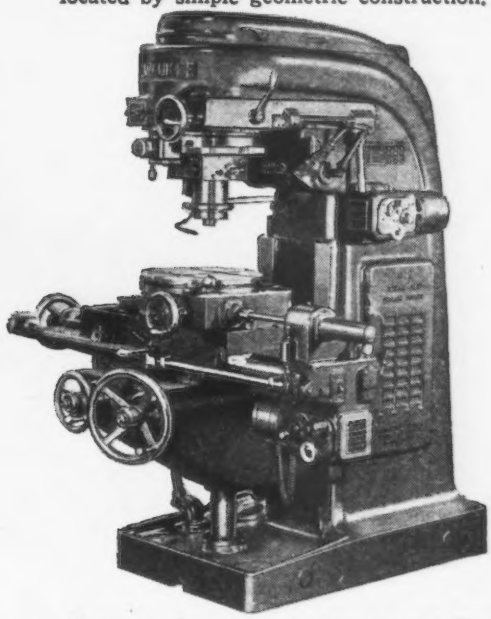




1 **FAST!** Both halves of the 14 cavity injection mold for these plastic shower curtain hooks were set up as a single workpiece or unit on the Kearney & Trecker Rotary Head Milling Machine table. All operations completed in this single set-up . . . changing only the special form cutters as required.

2 **DIRECT!** The operator accurately located the mold blocks in relation to the Rotary Head center. Scriber held in machine spindle laid out one cavity of each shape. No models or templets used — blueprint was only guide the operator used. Other cavities located by simple geometric construction.





3 **ACCURATE!** Completing work in single set-up reduced chance for error. Each operation performed on location of scribed layout and repeated on each additional cavity. Uniform precision results from this multiple origination method. Precise control of all cutter movements makes this possible.

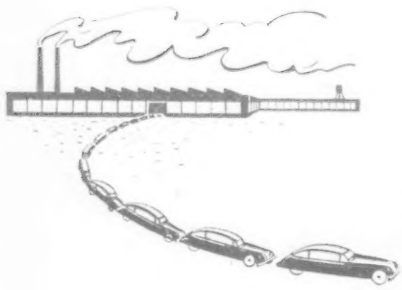
KEARNEY & TRECKER CORPORATION
MILWAUKEE 14, WISCONSIN

4 For more facts on how you can get Fast, Direct, Accurate results on other mold, tool, die, pattern, toolroom and general production work, using the Rotary Head Method, write for bulletin 1002C on the Model 2D Rotary Head Milling Machine.

Assembly Line . . .

WALTER G. PATTON

• Cadillac's foundry modernization program nears completion . . . Ford's top engineer tells about progress and trends in automotive engineering.



DETROIT—A foundry can make efficient use of the Assembly Line technique and a foundry can be a clean and attractive place in which to work.

This was amply demonstrated this week when the Cadillac Motor Car Co. was host to visiting members of the American Foundrymen's Assn. who were holding their 51st annual meeting in Detroit.

Culminating years of planning, Cadillac metallurgists and engineers have succeeded in virtually eliminating health hazzards in their foundry. Court roofs have been raised as much as 36 ft to bring in welcome sunlight, permit adequate ventilation and reduce heat. Giant blowers have been installed to draw out smoke and gas and dust from the pouring zones and shakeout locations. Locker and wash rooms that compare favorably with any in the industry have been installed.

Although all of the planned air circulation equipment is not yet in operation the novel experience of uncrowded conditions, welcome sunlight and ample quantities of clean air in a foundry is a refreshing innovation that was not lost on the AFA members who inspected the new Cadillac installation this week.

During the war the Cadillac foundry operated at peak capacity for a 4-yr stretch without a major shutdown for repairs. The huge modernization program had to be designed not only to meet postwar efficiency standards; it also had to provide for expanded Cadillac production including the growing requirements of other GM divisions supplied by Cadillac. For example, 85 pct of the castings for GM's Detroit Transmission Div. are supplied by Cadillac. Always in the background was the desire to make the foundry attractive to the personnel Cadillac wished to employ.

The modernization program was carried out without interrupting production in a building constructed in 1921-22. The entire operation has been planned along the assembly line pattern so as to reap the maximum benefits from progressive operation. Cadillac engineers proceeded on the promise that interruption in the flow of work anywhere along the line costs money. Wherever possible human effort has been eliminated with the result that the present operation is believed to be 85 to 90 pct mechanized.

The Cadillac "assembly line" foundry operation may be described as follows:

Raw materials are received and stocked at the west end of the foundry buildings. New 8000 ton sand storage buildings have unloading facilities at both ends of the storage bins.

An operator at a control panel in the sand mixing room draws sand from the drier which is conveyed to the mixing department. The same control panel governs the flow of oil from the core oil tanks (installed outside the building) to a reserve tank in the mixing room. Along with corn flour, kerosene and water these ingredients are metered automatically for final mixing prior to delivery to the core department.

AFTER mulling, the sand is released from the mixer and carried on a distributing belt to the storage hoppers. Here a tram-rail operator obtains sand for core blowing machines and delivers it to hoppers above the machines.

After cores are blown, spilled sand falls through a grating into a tunnel, which returns the unused sand to a newly-installed sand reclamation system.

All core sand is reclaimed. Ultimately it is expected that as much as 75 pct of the foundry sand will be reconditioned resulting in a substantial saving in the first cost of the sand as well as reduced handling costs.

Cores are baked and dried in continuous horizontal and vertical ovens.

An electro-magnet on a 10-ton crane loads scrap and pig iron into storage bins. Limestone is dumped into hoppers under the railroad tracks. Sea coal, bentonite, corn flour, brick and other supplies are brought in on a separate track to supply the storage buildings.

In charging the cupola a 5-ton bridge crane with electro-magnet lifts steel, pig iron and scrap into a weigh car beneath the first floor of the foundry. Coke and limestone are added from overhead bins. The charge is then dropped from the weigh car into a skip hoist which rises from the basement to the charging area, where it automatically unloads into the cupola.

Using this equipment each cupola can be charged by two men—a crane operator and a weigh car operator. No men work in the smoke, gas and heat of the charging zones. At one time as many as 15 men might have been used for this operation, according to Cadillac metallurgists.

Metal from the cupola runs continuously into a holding ladle where electric crane ladles on a monorail pick it up and carry the molten iron to pouring stations.

Cylinder crankcase molds are poured directly from the electric crane ladles. Hand pouring is used on the other three of four Cadillac conveyor lines.

EACH of the four conveyor lines —cylinder block, small hard iron parts, large soft iron parts and small soft iron parts—is equipped with a separate sand system. Sand slingers are used on both "hard iron" lines and jolt roll-out squeeze machines are used on the "soft iron" lines.

Cylinder crank cases and transmission case castings are transported from shakeout by Monorail to the cleaning room. Cylinder

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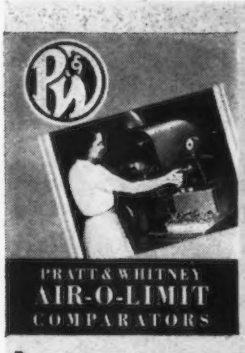

A Air-O-Limit Comparators

B Electrolimit External Comparators

C Electrolimit Internal Comparators

D Electrolimit Snap Gage

E Precision Gage Blocks

F Standard Measuring Machine

G Super-micrometer

H Multiple Electric Contact Gages

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crankcases are stress-relieved at about 1200°F. Other castings are sent across a mechanical shakeout and automatically unloaded into an oscillating conveyor which carries the castings to a cooling conveyor in the cleaning room.

In the next operation the castings automatically enter a wet tumbling mill and are tumbled for a distance of 59 ft. From the tumbling mill castings are automatically deposited on a slat conveyor for sorting into containers through individual chutes. Gates and sprues are removed and placed on a bucket monorail for delivery to scrap metal bins.

After sorting, castings are put through a wheelabrator or rotoblast. Following grinding and inspection, the castings are ready for shipment.

Cadillac's major objective—a modern, efficient foundry with attractive working conditions appears to be fully realized. The men and a substantial number of women presently at work have all been trained to operate the new equipment while producing with the previous operating methods—no small accomplishment in itself.

THE idea of "Looking Backwards to See Ahead" always appealed to the late Henry Ford. This may have been one thing Harold T. Youngren, vice-president and director of engineering at Ford had in mind when he discussed the subject, "Transportation—The Old and The New," before 400 members of the Engineering Society of Detroit recently.

After tracing the development of transportation in all its phases, Mr. Youngren got down to the story he knows so well—the modern automobile. Some of the specific engineering comparisons he offered his listeners must have come as a surprise even to those who have lived in Detroit for many years at the very hub of automotive engineering activities.

Discussing automobile engines. he pointed out that the 1947 V-8 Ford engine develops .42 hp per cu in. and has a compression ratio of 6.7 to 1. The model T engine developed one-tenth of hp per cu in. displacement and the compression ratio was 4 to 1.

A few years ago, Mr. Youngren pointed out, rod bearings, main bearings and rings were considered remarkable if they lasted 8000 miles. At least 50,000 miles of trouble-free operation is expected today, he asserted. Speaking of tires, Mr. Youngren reminded his audience that in the late twenties 18,000 miles for any tire was considered phenomenal while present day tires frequently last 50,000 miles. Meanwhile, by cutting pressures in half the industry has more than doubled riding qualities.

Because automobiles have better brakes average deceleration has been increased from 11 ft per sec to 28 ft per sec and pedal pressure has dropped from 150 lb to 100.

THE average post World War I car took 10 sec to climb from 10 to 25 miles an hr, while today's car will do the same thing in 6 sec.

A quarter of a century ago an average automobile had headlights good for an average visibility of 500 ft or less, and this dropped rapidly as the car aged. Today's sealed-beam headlights give double the visibility for the entire life of the car.

Today's x-type auto frames with bosed in sections are 10 times as rigid as yesterday's small open channel type, Mr. Youngren asserted.

Clutch pedal pressures have dropped from 50 to 60 lb to an average of 20 lb.

Superfluous weight has been stripped off. Post War I engines averaged about 10 lb per hp. whereas Post War II cars averaged only 6.5 lb per hp.

A check of average gasoline mileage delivered by a 1947 V-8 at 20 miles an hr indicates the car is moving 136 lb of weight of car per mile per gal. This campares with only 80 lb of weight of car per mile per gallon for the Model T, Mr. Youngren said.

In looking into the future, Mr. Youngren envisioned great transcontinental highways over which motorists may drive in safety and comfort at speeds approached today only on the speedway.

"The subject of transport presents a thousand and one challenges," Mr. Youngren said, "and the field is limitless. Its boundaries exist only in the imaginations of those who try to solve them," he concluded.

Kaiser-Frazer Reports During Year 1946 Net Loss of $19.2 Million

Detroit

• • • **During the year** 1946 Kaiser-Frazer Corp., reports a net loss of $19,284,680.83. Predictions that increased production during April will put the auto firm on a profitable operating basis were made by Edgar F. Kaiser, vice-president and general manager.

During the latter part of April Kaiser-Frazer was assemblying more than 400 cars a day. Scheduled operations called for production of 10,000 units in May and 12,000 in June, Mr. Kaiser said. Kaiser-Frazer has indicated that these schedules might be increased if deliveries of engines from Continental Motors Corp. are increased.

The loss reported in the operating statement includes all expenses for engineering, design and preparations for production of automobiles, no part of which has been deferred, according to Kaiser-Frazer officials.

Reviewing the operating record of Kaiser-Frazer, Henry J. Kaiser, chairman and Joseph W. Frazer, president of the company, reported that the first seven cars rolled off the assembly line last June. In September, 1130 cars were built; January production was 7141, and approximately 8000 will be built in April. Thus more than 37,500 Kaiser and Frazer automobiles have been turned out at the Willow Run plant to date.

During the past year Kaiser-Frazer is reported to have invested over $20 million in plant facilities, machinery, special tools and equipment.

Kaiser - Frazer investments in the common stock of Portsmouth Steel Corp, is reported to be $2 million. The company also has leased a blast furnace at Struthers, Ohio, from which it obtains pig iron for its grey iron casting requirements.

Employment at Kaiser - Frazer at the present time totals 9000, and a sales organization of over 4200 dealers and distributors including 150 foreign sales areas have been reported.

At the present time more than 4 million sq ft of manufacturing space are required for the Willow Run operations.

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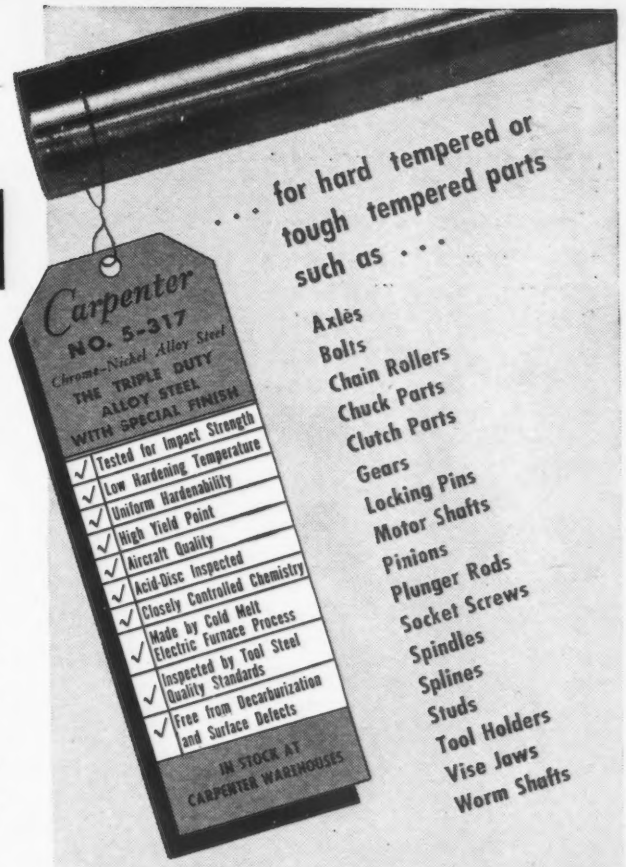

Washington . . . L. W. MOFFETT

• Labor union coverage hits peak in 1946 . . . Trend is away from maintenance of membership . . . Business interest in ITO charter contrasts sharply with government enthusiasm.

WASHINGTON — During 1946, the first full year of peace, organized labor had in effect collective bargaining agreements covering approximately 14 million workers, an increase of 1 million workers as compared with 1945, according to the Bureau of Labor Statistics.

About 7 million production workers in manufacturing were covered by union agreements in 1946 (69 pct of those employed) compared to 8 million (67 pct) a year earlier. In the nonmanufacturing industries 6 million workers or 35 pct of the potential coverage were blanketed under union agreements. Part of the decrease in the coverage in manufacturing industries is accounted for by changes in employment in such industries as aircraft and shipbuilding. The increase in the nonmanufacturing category can be accounted for by the higher employment in such industries as construction.

The number covered by closed shop and union shop agreements increased from 6 million for 1945 to 7 million in 1946. Workers covered by maintenance of membership provisions, which had increased during the war years, declined from 3 million in 1945 to 3 million in 1946.

Approximately 6 million workers, 41 pct of all under union agreements, were covered by some form of check-off provisions in 1946, an increase of almost 750,000 over the 1945 total.

While the number of workers covered by union agreements is not the same as union membership, the Bureau's report shows that the workers covered by such agreements represent 48 pct of the 31 million engaged in occupations in which the unions have been organizing and endeavoring to obtain written agreements. The percentage covered was the same as in the previous year, but fewer workers—approximately 29 million — were eligible for coverage in 1945.

There was little change in the proportion of wage earners under union agreements in specified industries during 1946. Between 80 and 100 pct of the workers in the following selected industries were covered by union agreements last year: Basic steel, nonferrous metals and products, metal mining, agricultural equipment, aircraft and parts, aluminum, automobiles, and parts, electrical machinery, and shipbuilding. In the 60 to 70 pct category were machinery, except agricultural and electrical, railroad equipment and steel products. In nonmetallic mining and quarrying only 20 to 39 pct of the workers were covered.

APPROXIMATELY 4 million were covered by closed and union shop with preferential hiring provisions in 1946, compared with 4,250,000 in 1945. Union shop clauses, without preference in hiring, were specified for almost 2 million workers in 1946 and 2 million in 1945. As previously indicated the number of workers covered by maintenance-of-membership decreased by 300,000 revealing a definite trend away from this type of agreement to the union or closed shop.

A few industries, including iron and steel products and shipbuilding, were not covered in the 1946 report because 50 pct of the workers in those industries were no longer covered by any one type of recognition clause.

The most marked change was noted in the auto industry. In 1945 over half of the covered workers had maintenance-of-membership provisions; in 1946, a little over 10 pct had such provisions, while a third were covered by union-shop requirements, a fourth by sole-bargaining arrangements, and another fourth by maintenance-of-union-dues requirements.

However, 50 pct or more of the workers in basic steel, machinery, aircraft, and metal mining were still covered by maintenance of membership agreements.

Proportion of Workers Under Union Agreement by Union Security in Selected Industries, 1946

Industry	Closed or Union Shop with Preferential Hiring	Union Shop No Preferential Hiring	Maintenance of Members	Preferential Hiring	Other
	(In Percentages)				
Agricultural Mach.	1	4	74		21
Aircraft and parts	6	8	62		24
Aluminum	5	14	79		2
Automobiles, parts	1	35	12		52
Electrical Mach.	9	15	57	1	1
Shipbuilding	32	11	48		9
Basic steel		3	93		4
Steel products	11	33	47	1	8

A little over half of the workers covered by check-off provisions in 1946 came under automatic deductions, while the others specified check-off of union dues only for employees who give the employer individual written authorization. In the manufacturing industries 4 million workers (61 pct) had their dues checked off compared to the 4 million (about 50 pct) in 1945.

Proportion of Workers Under Union Agreement by Type of Check-Off in Selected Industries, 1946

Industry	Voluntary Check-off	Automatic Check-off	No Check-Off
	(In Percentages)		
Agricultural machinery	13	41	46
Aircraft and parts	35	47	18
Aluminum	15	80	5
Automobiles and parts	6	59	35
Electrical machinery	19	65	16
Shipbuilding	17	43	40
Basic Steel	2	94	4
Steel products	21	43	36

MOVING ahead from May 15 to May 5, the date for opening the major discussions on the proposed International Trade Organization charter is hailed by its sponsors as a harbinger of good tidings. It is felt in Washington that this indicates a certainty on the part of the various delegations at Geneva that mutually acceptable

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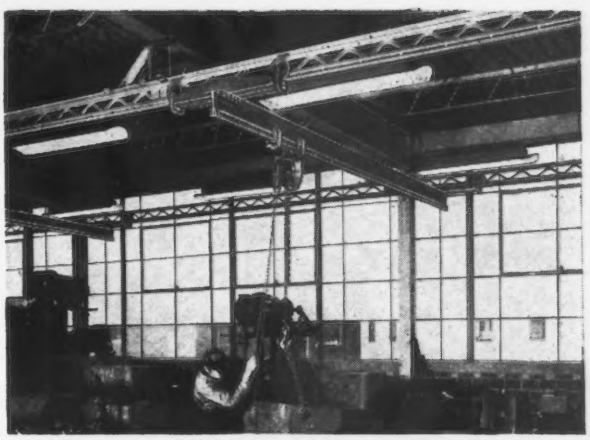

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trade agreements will be reached so they might as well get started on the charter which will set the new world trade pattern.

There are still disagreements, of course, for instance, as to how broad the exceptions should be for those countries who desire to impose export-import restrictions in order to protect natural resources from depletion. Most of the differences, however, are minor in character.

As a matter of fact, the major groundwork was laid down in London last year (THE IRON AGE, Oct. 17, 1946, p. 80) when representatives of the 19 nations met but some revisions will probably be necessary. Since that meeting, the various nations have had the opportunity in one way or another to feel out the reaction of the home folks toward the ITO.

At the series of hearings held in late February and early March under the sponsorship of the Executive Committee on Economic Foreign Policy, the views of about 245 organizations, businesses and individuals were presented either orally or by written statement. Witnesses appeared on behalf of 50 national organizations of which 27 spoke for business and farm groups while the remaining 23 represented labor, civic, consumer, veteran and even religious organizations.

It came as no surprise that business, professional and farm groups were most vociferous with 109 witnesses appearing to present the views of these three groups. Statistically speaking, civic organizations were represented by 41 persons and 17 appeared on the behalf of labor. Veteran organizations were represented by 11 witnesses.

In general, the witnesses may be broken down roughly into three classes—those approving the ITO, those opposing the proposed organization, and the middle-of-the-roaders who had little or nothing to say for or against the proposed charter. This latter group, involving some 21 witnesses, while not expressing either approval or disapproval were nonetheless greatly concerned as to what impact such agreements might have on their own industries. The general feeling of this group may be summed up in the words of one witness who declared:

"THE basic assumption (of the ITO) is that protective tariffs are evils. This has serious implications for many American industries which fear it because of the obvious threat to their tariff protection. Like the reciprocal trade treaties of the past which always contemplated tariff cuts and never any increases, the ITO is to be a tariff-reducing agency."

Generally opposing the charter were 16 witnesses of which half represented textile interests; three, food products; one, shoe and leather, and the others, varied interests. These were generally in agreement with a tariff league which declared that "the charter is confusing. It sets forth many basic principles and then proceeds to riddle them with exceptions, so that it ends by blessing not only the desirable but undesirable world trade practices."

Approval of the charter with little or no qualification came from more than 200 of the witnesses. In this group, individual business establishments and farm organizations were most numerous in this category although less than a half dozen were related directly with the metals and metalworking industry. Also strongly represented in this group were labor organizations or groups, civic organizations including women's clubs, consumer groups, chambers of commerce and boards of trade, foreign trade groups, churches and religious groups, and two organizations working for world peace.

Regardless of the arguments for or against the charter and organization of the world group, the Committee said, it was noticeable that most of the persons appearing for the hearings had apparently studied the proposed ITO charter and were thoroughly familiar with its objectives, indicating a much wider interest than had been supposed. Most of the suggestions, even those in opposition, were of constructive nature, it was said, indicating a desire to strengthen rather than weaken world trade relations.

WAIT A SECOND TILL I WIPE MY HANDS-- I'LL GIVE YOU A LIFT!
IF YOU WIPE THEM HANDS AGAIN IN TH' NEXT MINUTE, I'LL SCREAM! WIPING YOUR HANDS JUST TO PUT 'EM IN MORE DIRT!
THEM HAND-WIPERS IS AS BAD AS TH' GLOVE TAKER-OFFERS AN' PUTTER-ONERS!
EITHER ONE'LL SOON MAKE AN OLD MAN OF YOU!
5-9 J.R.WILLIAMS
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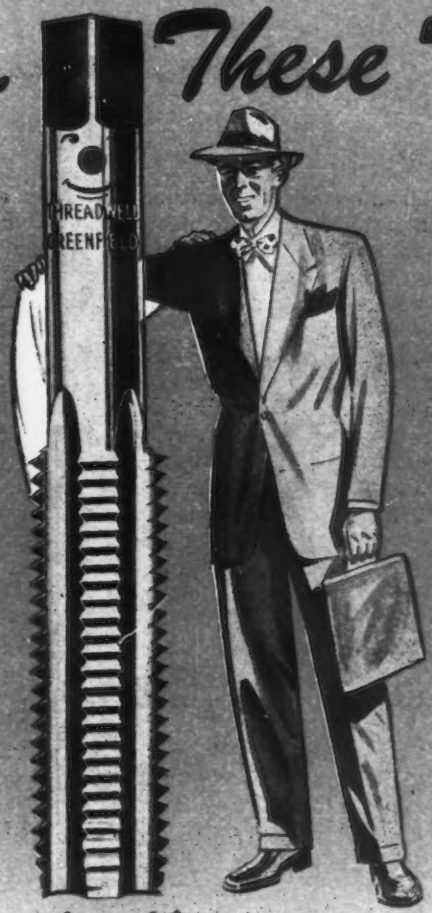
THE "SECOND" HELPING

OMD Controls Metals

Washington

• • • **On its last legs** since most of its activities were ended on Mar. 31, under the Second War Powers Act, CPA passed away on Mar. 4. Its remaining functions covering tin, antimony and several other scarce commodities and control over limited exports, were taken over by a newly established Office of Materials Distribution in the Bureau of Foreign and Domestic Commerce, Dept. of Commerce.

Why... These Two Belong On Your Team



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— because they're *greaseless rust-proofed* to keep them ready for instant use — clean, dry and shining.

— because they're "*tap-capsuled*" in metal capped transparent plastic tubes for complete protection and ease of selection *before* removal and handling.

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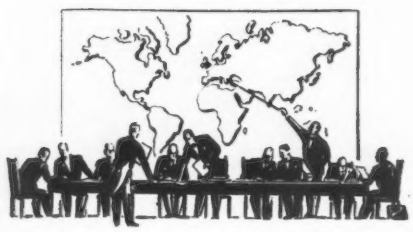
European Letter . . .

JACK R. HIGHT

• Belgian steel output remains static . . . Coal imports from the Ruhr lag . . . Imports from America being considered.



BRUSSELS—Belgian steel production remains virtually stalemated at the level of October last due to the shortage of fuel. Production is now averaging at an annual rate of about 2.6 million metric tons per year, and has remained static for the past 6 months. Due to the dependence of Belgium on coal imports and the discouraging prospects of domestic coal output in Belgium, steel sources here hold a pessimistic view as to the possibility of increasing the level of production this year. Other than hopes that it will be possible to maintain the present operating rate, there are no estimates of future operating possibilities.

The domestic coal production in Belgium has been leaning heavily since the liberation on the services of German "prisoners - of - war." There are said to be about 35,000 left in Belgium today, and 90 pct of them are employed in the coal mines. Plans have now been completed for their repatriation beginning in June of this year.

The return of these men to Germany will be spaced out over several months so as to prevent any sudden major drop in coal production, but due to the fact that there is a serious national manpower shortage in Belgium, there is little prospect but that the effect even over some months on coal supplies for steelmaking will be deleterious. The repatriation will be completed by the end of 1947, but the overall effect of this loss may not be reflected in steel output figures until the following year.

The Belgian Government is ambitiously recruiting former displaced persons from their camps in Germany for the replacement of the prisoners of war, but very few of them are skilled miners. The first arrivals have been the subject of much comment in the Belgian press, where it is noted that the DP's are mostly elderly people, many of them formerly of the professional and white collar classes, few of whom are of the type necessary for underground coal digging.

Coal imports from the Ruhr for Belgian industries have been suffering since last autumn when the British military government officials cut the exports from Germany in order to bolster the German economy. As expected the pressure applied by France and Belgium in Moscow this month has resulted in a new plan for exports from Germany, but opinion here is that Britain and America did not come very far on the way to supplying essential needs for the Western countries. There is a long-term plan that should mean more coal in the future, but that is when these countries expected to get it. Their immediate hopes were to improve the possibilities for greater current exports from the western German mines.

As long as Britain and America go forward in their plans to make the occupation a paying proposition if possible, the probabilities of Belgium and France getting their coal requirements are nil. Looking at this prospect realistically, the Belgian steel industry probably does not expect much more help in the form of coking coal from Germany than it has been getting.

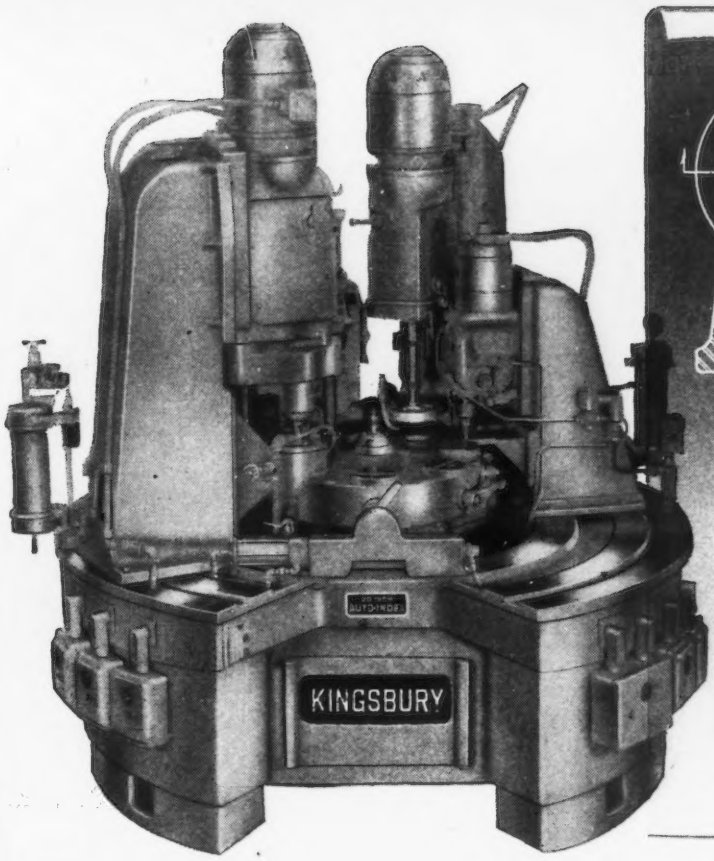
AS IS every other European country, Belgium is also considering the possibility of increased exports from America, which might materially aid in the overall fuel problem. From the steel standpoint, the possibility that some high grade coals may be included in American exports looks promising, but there will be so many claimants in the European Coal Organization for this quality coal, that the slice going to Belgium must certainly be a small one. The exhaustion of dollar supplies for coal imports may favor Belgium, as its dollar position is among the most favorable of all the European countries, but all countries are expected to at least have sufficient dollars to be able to buy any really good coking coal that may be available this year from the United States.

As in most other countries which are historic coal importers, the steel situation is suffering even more than the bare statistics of reduced coal imports indicate. There are other industries where the need for solid fuel is less reducible than it is in steel. Gas and electricity plants, and often to some extent domestic heating requirements, must be maintained to a certain level, and are more essential than steel. Thus, although coal imports may be down only 40 pct, coal imports for steel may be suffering 60 pct or more.

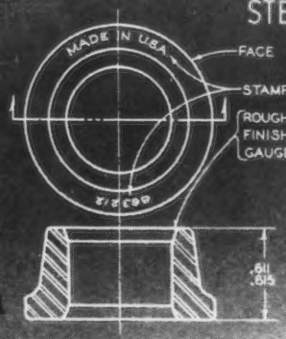
Barring the coal shortage, the Belgian steel industry would be in a position to operate at full prewar capacity. There is a slight labor shortage which affects particularly the less desirable jobs in hand sheet mills and pickling operations, but in general the manpower problem in the industry is not serious.

The other most serious problem that is worrying Belgian producers is a price problem, and also reverts to coal. Recently, (see THE IRON AGE, Mar. 27, p. 88) coal prices were increased substantially due to the removal of a heavy subsidy, but steel prices were not increased as much as had been expected. At the moment, as long as the industry is exporting half its production into markets where the prices are much higher than controlled domestic prices, the industry is able to make up for the low internal price by high export prices.

THERE is no doubt, however, that the industry here is cognizant of the signs that the international steel market is gradually changing in character. A year ago,



STEEL BEARING CONE

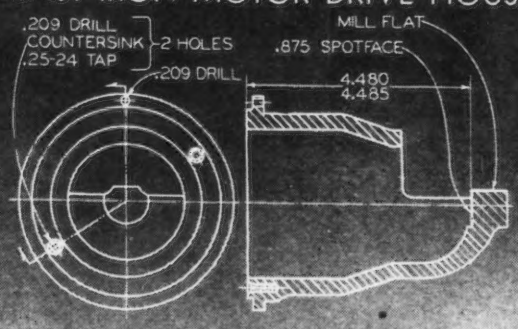


PROBLEM Face, rough and finish form, stamp and gauge 1300 pieces per hour with one operator.

METHOD This is a terrific production rate. The operator only has to load it. Everything else is automatic. An air-operated handle clamps each fixture. A power drive unit indexes the table. Automatic units at 3 stations machine each piece. An air-operated device stamps them. A cam unclamps each fixture during the index. A unit with a plug gauge checks each part and stops the machine if it does not gauge. An arm removes the finished piece. The gross production is 1640 pieces per hour.

COMBINED OPERATIONS *for* HIGH PRODUCTION

CAST IRON MOTOR DRIVE HOUSING



PROBLEM Drill, countersink, tap, mill and spotface 420 pieces per hour with one operator. Maintain accurate depth and central location of the spotface.

METHOD A bushing guides the spotfacing tool. The bushing carrier is mounted on guide rods anchored securely. The shank of the tool has a micro adjusting nut for setting its depth accurately. A multiple-spindle head on a standard unit drills 3 holes. Two others countersink and tap two of the holes. A unit with a standard milling attachment mills the flat. The gross production is 540 pieces per hour.

Kingsbury designs, builds and tools single purpose machines with standard units up to 5 hp each. Send us prints showing your operations and hourly output, and ask for a proposal. Kingsbury Machine Tool Corp., Keene, N. H.

KINGSBURY

no quarter was given, and no haggling was permitted by the seller—all products were quoted on a take-it-or-leave-it basis. Today, although Belgian sellers still are able to sell their steel at their own convenience, there is admittedly some haggling on price matters. But as long as the Belgian producer can sell galvanized sheets for $320 per ton to brokers who are able to resell to India at $400 per ton, there is ample scope for profitable operation for all concerned—barring possibly the consumer.

When the day comes that the seller's market ends, the industry expects to demand a higher domestic price from the Belgian Government, tacitly admitting that the overseas buyer is being used to subsidize the Belgian domestic market at the moment.

Present indications are that the industry here is making haste slowly on its modernization plans. There is no coordinated national steel development plan in Belgium as there is in France and England, but three of the largest producers have recently floated large fund-raising issues in the Brussels bourse for undisclosed purposes which are generally acknowledged to be for modernization expenses. Although there is a modicum of interchange of technical planning between the various Belgian producers, the overall development is probably less integrated than is the case in the British Iron & Steel Federation, where the domestic cartel holds a strong whip hand on all expansion programs.

THERE is already a fairly high degree of product specialization in the Belgian steel industry, and it seems likely that present plans do not call for any more important rationalization programs. There will be some more, but it will largely be in the way of technological trends toward larger production units rather than in the form of important mergers of existing mills or companies.

As long as there is a high demand for finished steel products, the Belgian industry hopes in the postwar period to maintain and increase its exports of finished steel products, and to reduce the prewar percentage of semifinished steel shipments. The recent agreement to ship small quantities of semis to the United Kingdom was entered into reluctantly, both because of economic factors and because there are finishing mills standing idle in Belgium today.

Opinion here is that substantial semifinished steel shipments will never be resumed from Belgium until there may be a slump in the finished steel market—at that time there would conceivably be a market for semis. There is a strong move in the industry to balance rolling mill capacity with steelmaking output. The semifinished steel supply problem in Belgium itself is acute at present, as special concessions are being made by integrated firms to keep the important rerollers in business.

Outside the steel industry in Belgium there are indications that conditions may be improving. Some prices are showing a substantial downward trend. They are still several times greater than prewar, and the laboring man is still barely scraping through. The abolition of most rationing and much price control has been accomplished, but there is still general reluctance or real inability for the Belgian people to do much buying at present prices. On the luxury side, there are said to be 10,000 new American cars in Brussels alone—they make the narrow streets as hazardous as Chicago alleys in the twenties. The influence of imports from America is to be seen everywhere in Belgium. Tinned foods and fresh fruit from the United States are in evidence everywhere.

Austria Nationalizes Iron and Steel Plants

Paris

• • • **In addition to** the blast furnaces at Donawitz in Austria, the nationalization decrees in that country also applied to the Gebruder Bohler and St. Egydyer iron and steel industry. The reorganization of the companies under the government is going forward at present.

The Gebruder Bohler plants were seriously damaged during the war, and the plants at Deuchendorf, St. Marein and Enzesfeld were almost completely dismantled in 1945. Valuable modern equipment is also reported to have been taken from Ybbstal and Kapfenberg. Despite these losses the firm was able to achieve 65 pct of the prewar operating rate in September of last year. Due to the winter fuel shortage production fell away sharply in more recent months.

France Signs Agreement

Paris

• • • **France has** signed a new trade agreement with the Netherlands, renewing that of April 1946. Goods estimated at 9 billion francs ($75 million) will be exported by France to the Netherlands, including iron and steel products and mechanical and electrical equipment. In return France will receive from the Netherlands agricultural produce and industrial products including coke, and will place orders there for ships. The Dutch East Indies will ship tin and rubber to France.

Under an agreement recently signed with Norway, during 1947 France will export goods valued at 3200 million francs ($26 million) to Norway in return for imports totaling 2700 million francs ($22½ million).

May Revise Auto Taxes

London

• • • **The British Society** of Motor Manufacturers is proposing to ask for the revision of the system of taxing private automobiles. It is urging that the present horsepower tax should be replaced by a nominal registration fee—$20 has been suggested—for a car of any horsepower, plus a further tax on gasoline. To keep the revenue from automobile taxation at its present level, it is estimated that an increase of around 8¢ per gallon would be required.

Italy Fixes Steel Prices

London

• • • **The Italian** Government has fixed the following prices per metric ton for iron and steel: Ordinary pig iron for steelworks, $64; foundry pig iron, M.F. and hematite, $70.40; steel ingots, AOO (homogeneous), $80; billets, $98.66; hot-rolled products, $114.66. In converting to dollars, the rate used is the average of the official rate of 225 lire to dollar and the free market rate of 525 lire to dollar.

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6. Simplify inventories by standardizing on fewer types and sizes of fasteners
7. Save purchasing time by buying larger quantities from one supplier's complete line
8. Contribute to sales value of final product by using fasteners with a reputation for dependability and finish

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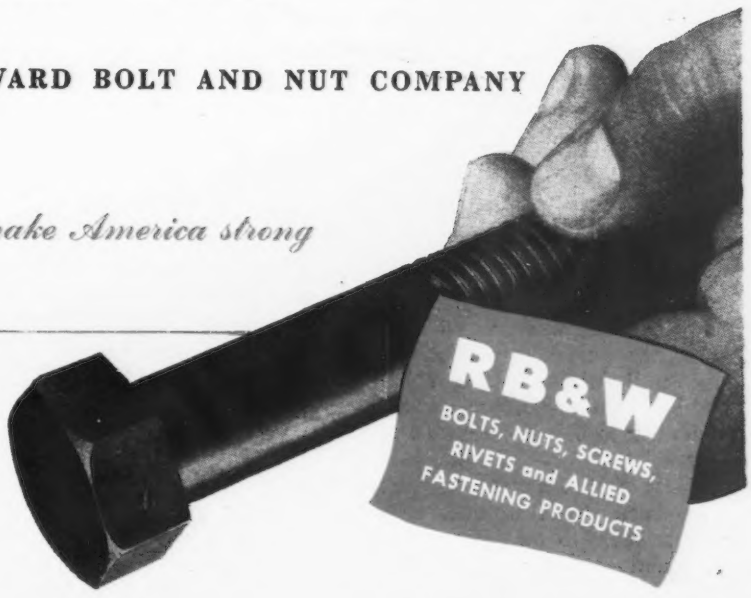
the things that make America strong



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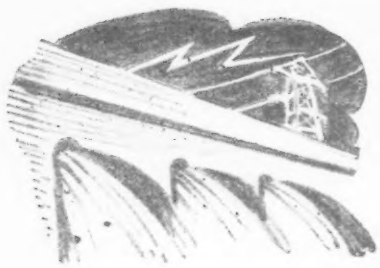
West Coast . . .

ROBERT T. REINHARDT

• Decisive words of Brigham Young keynote position of Utah industry in centennial year . . . Geneva production at high rate with but few bottlenecks remaining.



SALT LAKE CITY—"This is the place," the words spoken by Brigham Young July 24, 1847 as he viewed the valley of the great Salt Lake and thus established the site of Utah's greatest city, have taken on a significance of which even this far-sighted pioneer probably never dreamed.

As Utah opens its $1½ million centennial celebration the Mormon leader's words are being interpreted to apply to every phase of the economic and social life of the state where thrift and industry have historically been held in high regard.

Industry-wide, it would have been difficult to select a more propitious year in which to celebrate achievement.

Geneva Steel Co. is operating in excess of its newly established 784,000 ton per year capacity and its plate mill, working 15 turns a week, has a backlog of orders running well into 1948 according to Walther Mathesius, president. The structural mill is running 10 turns per week.

Most of the bottlenecks which have been handicapping production appear to have opened up. Coal and ore car shortages and housing facilities for coal miners are still problems. Although the company has purchased the town of Dragerton, it is unable to evict several dozen families which took up residence there during government ownership and who do not work in the mines.

Coking appears satisfactory with the ovens producing approximately 58 pct blast furnace size metallurgical coke entirely from Utah coal which is reported to be running between 0.6 pct and 1 pct sulfur.

Blended ore is running approximately 50 pct iron with sulfur about .02 pct.

Openhearths are averaging 200 hr life before rebuilding and a test installation is being made of refractories produced by The Permanente Products Corp. in California.

Although all equipment for conversion of the plate mill for production of wide, hot rolled strip has been ordered according to Mr. Mathesius, it is believed work on the mill alterations and extensions will not be underway until well into 1948 because of delay in getting deliveries of motors and other components and in view of the heavy demand for plates.

Industrialists of this area are optimistic over the permanent establishment of the recently announced lower freight rates from Geneva to Pacific Coast points although they do anticipate a general review of all western rates in relation to water rates.

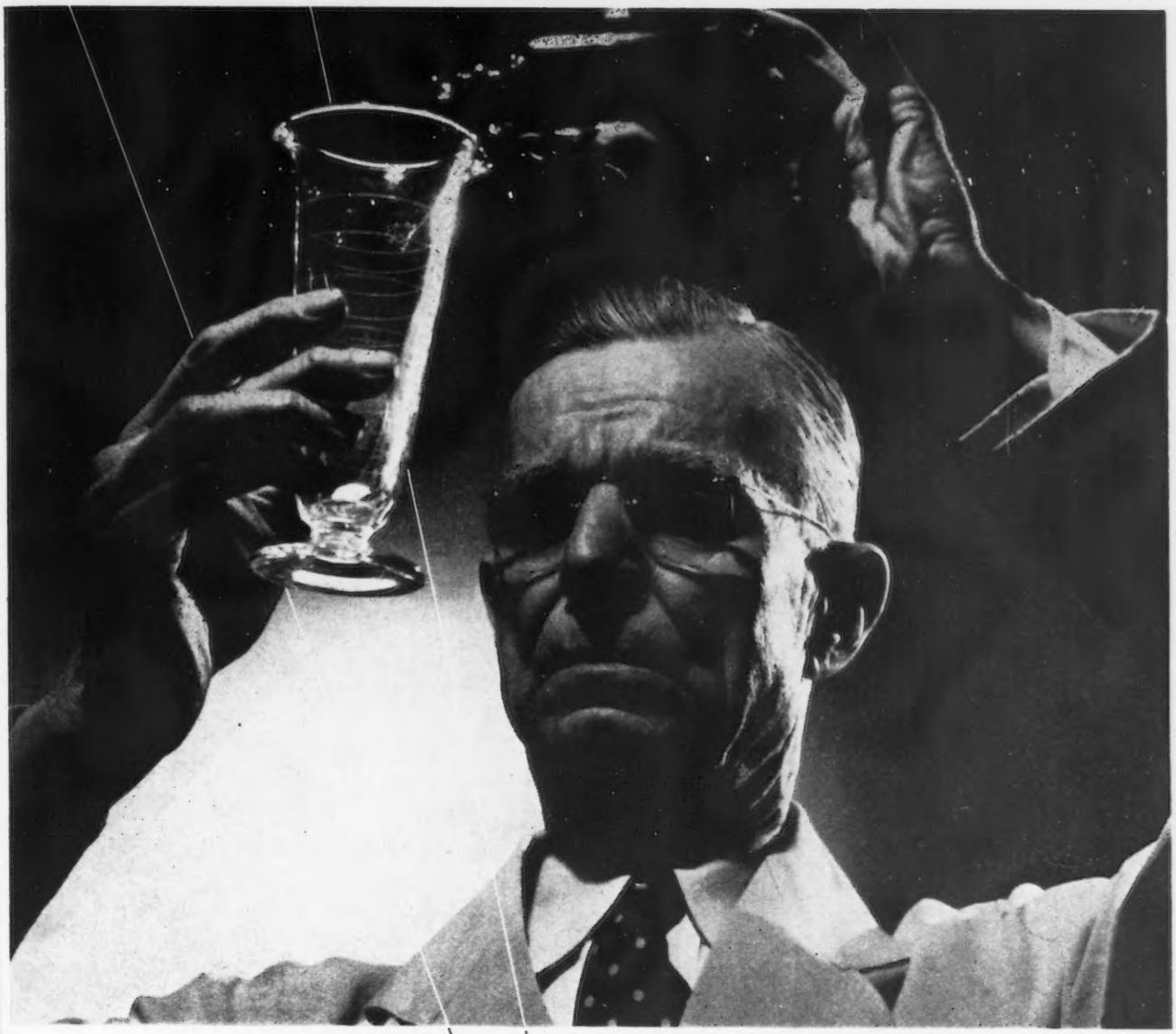
Some of the overly-enthusiastic boosters for the industrialization of this area were saddened a little by a portion of a speech delivered by Mr. Mathesius before a business group in Boise, Idaho, last week when he said:

"IT is true that there is a fair tonnage of steel being sold in the Intermountain area; however, from a market standpoint, it is an area which still remains largely potential and must pass through considerable development, industrial expansion and population growth to provide large enough market demands close to home, whereby to utilize the bulk of the output of the Geneva steel plant. For the near future, the continuing steel shortage, not only in the western market but in steel markets generally, will act as a definite deterrent to the establishment of fabricating plants in the Intermountain area. The steel shortage would not only affect the ability of a company to obtain steel for the erection of a plant and the acquisition of equipment, it would also seriously impede the company's ability to obtain steel stocks for use in its fabricating operations. Thus, for the time being, the Pacific Coast is still the primary market which must be reached economically by Geneva Steel Co. if the Geneva plant is to maintain operations at a high enough rate to earn a reasonable return on invested capital."

Perhaps reflecting the difficulties his own company is experiencing with tax assessors in Utah, Mr. Mathesius said:

"I have been asked the question many times: Will the Geneva steel plant stimulate fabricators and other steel users to come to the Intermountain states with their plants? I think that it is quite safe to predict that this will happen over a period of years, provided, of course, that state and local government are aware of their responsibilities to create the proper atmosphere for concerns who are anxious to build their plants in this Intermountain country. Solicitation and cooperation by Advertising Clubs, Chambers of Commerce, and the promotion agencies of the railroads, is, of course, to be encouraged to attract and assist industrial newcomers, as are also such efforts as are comprised in the program of the Utah State Dept. of Publicity and Industrial Development. However, these stand unfortunately in a rather strange contrast with the official attitudes of other agencies of local and state governments.

"Only too often do we find, for example, that local and state taxing authorities look rather shortsightedly upon new industrial enterprises and their investments as welcome sources of additional rev-



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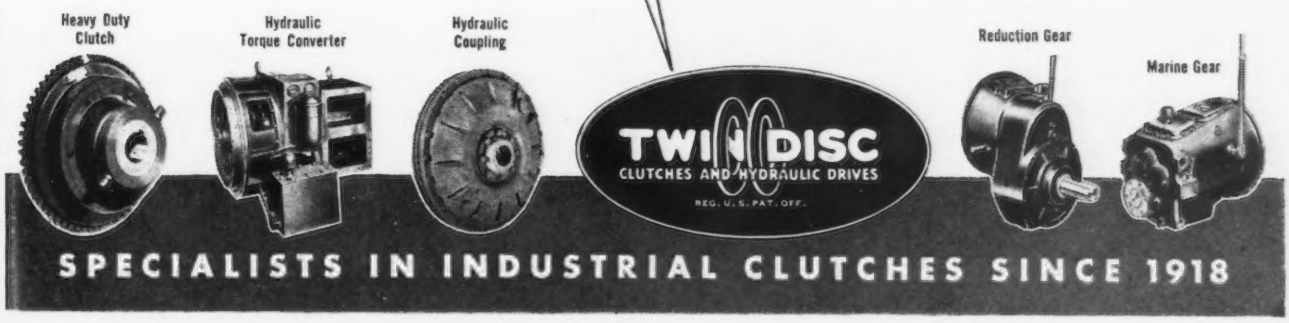


SPECIALISTS IN INDUSTRIAL CLUTCHES SINCE 1918

enues in the form of direct taxes assessed against their newly developed real and personal properties, and of sales or use taxes on machinery and facilities purchased for installation.

"Most certainly, new industries should be expected to share fairly the burden of taxes with agricultural, residential and other properties of the community. However, to single them out and to assess against them direct taxes in such amounts as to impose upon them a financial burden several times as heavy as that carried by their competitors in other states, represents a policy which is bound to deter rather than encourage industrial growth."

WHATEVER the reason may be—high tax assessments or freight rates—there has been no rush to establish metal using plants in the immediate vicinity of the Geneva plant. Besser Mfg. Co., which was announced as putting in a plant here, and a steel fabricating company have, in fact, withdrawn from the area.

Established fabricators and manufacturers, however, are proving to be good customers of Geneva, Bethlehem and other producers.

Eimco Corp., with which are affiliated the Structural Steel & Forge Co. and the American Foundry & Machine Co., is now operating at the highest rate in its 68 year history producing mining machinery such as vacuum filters, grinding mills and loading equipment.

The overall operation employing 600 men consumed approximately 11,000 tons of structural shapes in 1946 according to Joseph Rosenblatt, president and general manager. It is understood that at present the company is purchasing about 400 tons of structural shapes per month from Geneva alone, and that the fabricating plant is now being doubled in size.

Approximately 80 pct of the company's output is being sold and delivered outside of the Intermountain area, according to Mr. Rosenblatt. With some modifications much of this machinery is being used in the chemical and steel industries. One of the loading machines built by Eimco is being used in the steel industry for cleaning out openhearth slag pockets and 2 similar machines of new design is expected to be on the market next year. It will also be used for loading charging boxes with ores and fluxes.

Alloy steel castings are being shipped to customers as far east as Wisconsin it is reported, and this job work constitutes an important part of the production of the foundry turning out approximately 750 tons of castings per month. The 1½ ton Rennerfeldt electric furnace installation, made here in 1913, is claimed to be the first west of the Mississippi. Eimco now has a 2000 KVA Moore Electromelt furnace which is to be replaced next year by a top feed model. High power rates are proving a competitive disadvantage according to Mr. Rosenblatt.

DENVER — Colorado Fuel & Iron Corp. is entering the field of chemicals with first operation at the Rocky Mountain Arsenal where they have taken a long term lease from the U. S. Engineers, Missouri River Div. to produce caustic soda and chlorine from salt shipped from Kansas mines.

At start of operations about 100 men will be employed and intentions are to expand processes to include utilization of any excess benzol produced at its by-product coke plant in Pueblo where 266 ovens are in operation.

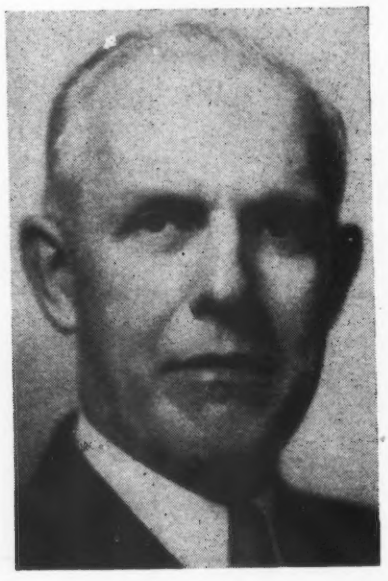
Production of steel products at the Pueblo plant continue at a high rate and John McAllister, vice-president and A. M. Riddle, marketing research, who just returned from a tour of eastern markets are optimistic about the future.

Loss of the 3000 acre Denver Ordnance Plant site to the Federal Government for use by the Bureau of Reclamation and Veteran's Administration is still a sore spot with many Denver industrialists who had hoped that at war's end this area would be made available as an industrial tract. Little less enthusiasm is displayed over the action of the government in offering the forge plants, formerly operated by the Kaiser interests for shell production, for sale and removal. It is contended that the plant which cost approximately $1 million is worth much more as and where it is than if removed at an estimated cost of $250,000 and re-erected elsewhere.

J. L. Perry Elected As Temporary President Of Columbia Steel Corp.

San Francisco

• • • J. Lester Perry, assistant to Benjamin F. Fairless, president of U. S. Steel Corp. of Delaware, has been elected president of Columbia Steel Co., U. S. Steel's West Coast subsidiary, succeeding the late William A. Ross, who died in San Francisco on Apr. 19, 1947.



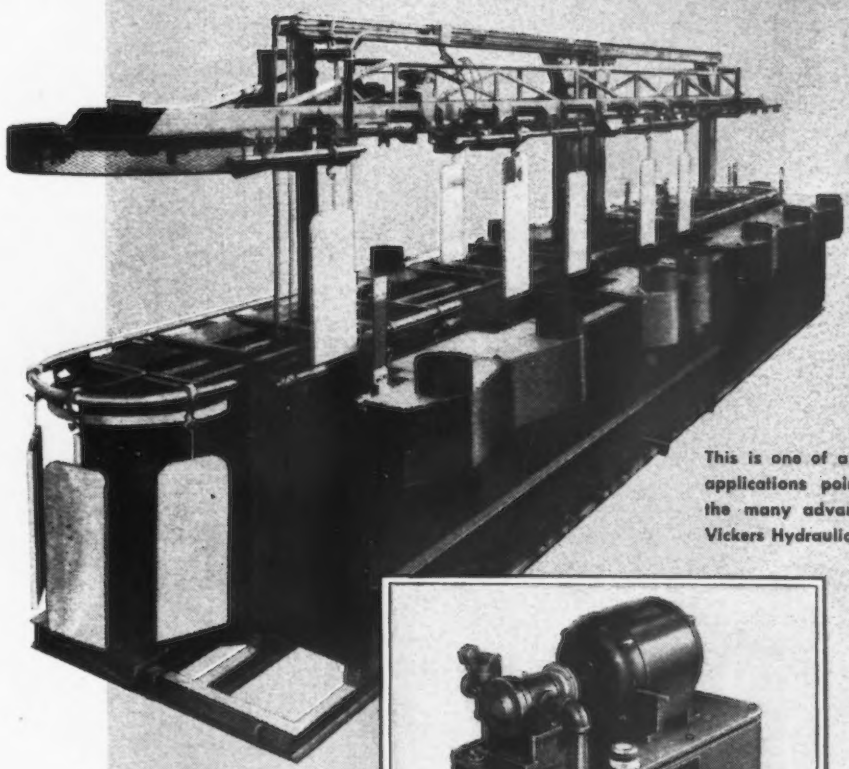
Mr. Perry, who has spent his entire career in the steel industry, began as a cost clerk and rose to the presidency of Carnegie-Illinois Steel Corporation, U. S. Steel's largest steel producing subsidiary. He retired from that post on July 31, 1946, to become Assistant to president Fairless. Mr. Perry was scheduled to retire from the Steel Corp. on May 1, but has agreed to serve as president of Columbia until a permanent successor to Mr. Ross is elected.

Commenting upon Mr. Perry's election as president of Columbia, Mr. Fairless said: "Mr. Perry will bring to our West Coast operations a breadth of experience in the steel industry which is second to none. His career has been marked by outstanding achievement. Under his leadership Carnegie-Illinois broke all existing records in the production of steel for war and peacetime reconversion."

VICKERS helps achieve HYDRAULIC EQUIPMENT

HIGH PRODUCTION
SPACE ECONOMY
UNIFORM QUALITY

IN Udylite AUTOMATIC PLATING MACHINE



This is one of a series of applications pointing out the many advantages of Vickers Hydraulic Controls.

Above: Elevated position for transfer from one tank to the next.

Vickers Hydraulic Power Unit.

This Udylite machine does a complete plating job automatically . . . taking each part through seven tanks and a drying chamber . . . timing exactly the interval in the various solutions for cleaning, plating and rinsing.

Each part (or rack of parts) is automatically lowered into each of the seven tanks in turn—then lifted out and transferred to the next tank. This might be done with a multiple dip conveyor. But the conveyor slants permissible in lowering and raising in that way require extra tank length.

Udylite made the machine far more compact—saving 18" to 24" in the length of each tank—by using Vickers Hydraulic Equipment to raise and lower the entire conveyor assembly at each transfer. By this means, each piece (or rack) is lifted straight out of the tank, moved over the next tank and lowered straight down. This provides better cleaning and more uniform plating—better drainage and less contamination of the solutions.

The Vickers Hydraulic Power Unit and Control Valves have many advantages for such applications: (1) proven dependability, (2) accurate control and precise timing, (3) flexibility of control to suit varied production requirements, etc.

The versatile features of Vickers Hydraulic Equipment on this type of application, as on many other industrial installations, have made possible increased production, improved product quality, greater safety, and lessened physical demands upon labor while increasing its productivity. Vickers Application Engineers will gladly discuss your individual control problems.

VICKERS Incorporated

Subsidiary of the Sperry Corporation

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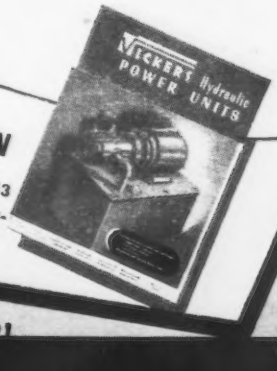
Application Engineering Offices: ATLANTA • CHICAGO • CINCINNATI
CLEVELAND • DETROIT • LOS ANGELES • NEWARK • PHILADELPHIA
ROCHESTER • ROCKFORD • SEATTLE • TULSA • WORCESTER

New BULLETIN

Write for Bulletin 46-43 describing Vickers Hydraulic Power Units.



ENGINEERS AND BUILDERS OF OIL HYDRAULIC EQUIPMENT SINCE 1921

PERSONALS

• • •

• **William A. Wenner** has been elected president of All Metal Products Co., Wyandotte, Mich. **C. Lee Edwards,** former president, has been elected chairman of the board; **John R. McInerny,** vice-president; and **Cyril Readhead,** secretary-treasurer.

• **Boyd O. Bach** has been appointed manager of sales, fabricated steel construction, Bethlehem Steel Co., Bethlehem, Pa. He succeeds **Charles A. Johnson,** who is retiring. Mr. Bach, who since 1944 has been assistant manager of fabricated steel sales, started with the company at the Steelton plant in 1922.

• **R. H. Daisley,** vice-president and director of operations, Eaton Mfg. Co. has been elected a director of Cleveland Hobbing Machine Co., Cleveland.

• **Grant F. Neely** and **Harry J. Anderson** have been named sales engineers for Vulcan Mold & Iron Co., Latrobe, Pa. Mr. Neely comes to Vulcan from the American Rolling Mill Co. where he had been employed since 1936, except for 3 years' service in the Navy. Mr. Anderson was chief engineer and mold designer at Vulcan before assuming his new position.

• **W. H. Stewart,** Seattle service manager for Hagan Corp. and Hall Laboratories, has been reassigned to the home office at Pittsburgh as sales engineer for combustion control and boiler water conditioning.

• **Justus W. Lehr** has been appointed district manager in charge of the Berwick, Pa. plant of American Car & Foundry Co., succeeding **Guy C. Beishline,** who has resigned. Since coming to ACF in 1940 he has served as assistant district manager of the Berwick plant until the time of his transfer as head of the Chicago plant in 1944.

• **G. V. Patrick** has been elected president of Etched Metal Co., Cleveland. **J. H. Snyder** has been named vice-president of the company.

• **Andrew W. Hughes** has been named supervisor of the central cost bureau of Rheem Mfg. Co. He will make his headquarters in the company's New York office. Mr. Hughes joined Rheem in 1943.

• **Olaf Haug** has been appointed as Borg-Warner International Corp. automotive representative for continental Europe and Scandinavia. Mr. Haug's headquarters will be Oslo. He was formerly European regional representative for Carter Carburetor Corp. and also served as service parts sales representative for the General Motors Antwerp Div.

• **D. J. Van Dyke** has been appointed manager of the Hy-Alloy Steels Co. new district sales office in Detroit. Mr. Van Dyke was formerly associated with the purchasing department of the Chevrolet Div., General Motors Corp., and the Continental Motors Corp.

• **T. M. Haddock** has been named district purchasing agent, eastern district, by American Steel & Wire Co., with headquarters in Worcester, Mass. **Otto C. Langenhan** has been appointed acting district purchasing agent in Cleveland, while **Frank J. Vaigl** will succeed him as chief clerk and buyer in Cleveland.

• **J. B. Misenhimer** has been named manager of sales for American Can Co. in Canada, after having served in New York as assistant in the general sales department. His headquarters will be at Hamilton, Ont.

• **Dana L. Tyler** has resigned as secretary and assistant treasurer of the Utica Drop Forge & Tool Co., Utica, N. Y., to become secretary and assistant treasurer of the P. C. Lissenden Construction Corp., West Palm Beach, Fla.

• **Charles R. Hook** has been elected president and chairman of the executive committee and **Calvin Verity** as chairman of the finance committee of the American Rolling Mill Co., Middletown, Ohio. Also **W. W. Sebald** has been elected executive vice-president; **R. L. Gray, F. E. Vigor, J. A. Ingwersen** and **C. H. Murray,** vice-presidents; **H. H. Tullis,** vice-president and controller; **W. D. Vorhis,** secretary; and **F. D. Danford,** treasurer.

• **H. A. Gehres** has been named executive vice-president and director of engineering of Cooper-Bessemer Corp., Mt. Vernon, Ohio. **R. L. Boyer** has been appointed vice-president and chief engineer; and **L. F. Williams,** secretary and assistant to the president.

• **Louis W. Falk,** executive engineer and secretary of Falk Corp., Milwaukee, since 1942, has been added to the board of directors; **Richard Falk,** assistant to the president and assistant secretary, and **Leroy J. Burlingame,** member of the Milwaukee law firm of Quarles, Spence & Quarles, have also been named to the board.

• **Richard E. Roberts,** director of employee relations for the Fisher Body Div. of General Motors Corp., is joining the Ford Motor Co., Dearborn, Mich., as director of the community relations department. Mr. Roberts formerly headed GM's operating community activities.

• **John J. Borrup** has retired from the Pratt & Whitney Aircraft Div. of the United Aircraft Corp. at East Hartford, Conn.

• **Robert T. Sheen** has been elected president of the Milton Roy Co., Philadelphia. **John W. Welker** has been elected vice-president and general manager; **E. Elizabeth Sheen,** secretary, and **John J. Smith,** treasurer of the company.

• **Louis B. Wackman** has been elected a director and president and treasurer of Southline Metal Products Co., Houston. He was formerly president-treasurer of Wackman Welded Ware Co., and later an executive adviser and consultant to J&L Steel Barrel Co., Jones & Laughlin subsidiary.

• **L. A. Hamilton,** formerly assistant manager of Air Reduction Sales Co.'s Seattle district, has been appointed manager of that district. **Emmett W. MacCorkle, Jr.** has been appointed Airco's Portland district manager. Until his recent promotion he was assistant manager of the gas sales department, New York office. **Herman Van Fleet, Jr.** has been made manager of Air Reduction's New England district, with headquarters at Boston. He entered the employ of the company in 1937.

• **R. B. Tripp** has been elected president, Ohio Forge & Machine Corp., Cleveland. Mr. Tripp was formerly vice-president of the organization. **T. E. Leighton** has been named vice-president. He will continue to serve as treasurer of the company. **C. E. Thayer** has been named secretary of Ohio Forge.

• **Gene P. Robers,** advertising and sales promotion manager, Weatherhead Co., Cleveland, has been promoted to sales manager of the replacement parts division.

• **David C. Peterson,** former industrial consultant, has been appointed director of engineering and research at the main Chicago plant of Stewart-Warner Corp. Before joining Stewart-Warner, he was actively engaged for 6 years as an industrial consultant to several large Diesel engine manufacturers.

• **Harold F. Fulton** has been appointed Cowles Detergent Co.'s technical man in the New York State territory to handle sales and service work for the metal cleaner department. He has had a wide experience in the metalworking industries and during the war was employed by Allegheny Ludlum Steel Corp. at its Dunkirk, N. Y. plant.

• **George L. Brunner, Sr.** has retired from the management of the Brunner Mfg. Co., Utica, N. Y., and **A. G. Zumbrun** has become chairman of the board and managing director of the firm. **Alfred D. Sullivan** has been named chief engineer.

• **William M. Stark** has been named manager of Federal Electric Products Co.'s southwestern district, with headquarters in St. Louis; **George L. Stout** is the new manager of the east central district with offices in Cincinnati; and **Clarence G. Landeck** becomes manager of the middle western district with headquarters in Chicago. Mr. Stark came to the Federal sales organization in 1944. Mr. Stout, prior to joining Federal in 1946, had been district manager for Trumbull Electric Mfg. Co. for 2 years. Mr. Landeck came to Federal early in 1946 as office manager in Chicago.

• **Herman A. Grishkat** has been appointed district manager in northern New York State and in Berkshire County, Mass., for the Federal Machine & Welder Co., Warren, Ohio. In addition to taking over the complete line of Federal resistance welders, he will continue to serve as district manager for Warco Sales Co., continuing to make his headquarters at the Warco Sales offices in Buffalo.

• **Robert H. Smythe** has been appointed manager of a new office of James Flett Organization, Inc., in Philadelphia.

NEWELL H. ORR, vice-president in charge of sales, Colorado Fuel & Iron Corp. and subsidiary companies.

• **Newell H. Orr** has been appointed vice-president in charge of sales of the Colorado Fuel & Iron Corp., Denver, and subsidiary companies. Mr. Orr has been in charge of western division sales and began his association with Colorado Fuel & Iron in 1935. Prior to that time he was connected with the American Bridge Co., Jones & Laughlin Steel Corp. and American Iron & Steel Institute. **William S. Boyce** has been appointed general manager of railroad sales for the Colorado Fuel & Iron Corp. At the same time **F. S. Jones,** formerly sales manager of wire products, was appointed general manager of commercial sales for the western division which includes the territory west of the Mississippi River.

• **John H. Hall,** general auditor, Youngstown Sheet & Tube Co., Youngstown, Ohio, has been elected treasurer of the company succeeding **George E. Benson,** who has retired. **Paul M. Haas,** secretary to Frank Purnell, president, has been appointed auditor, succeeding Mr. Hall. **Floyd D. Hunter,** Youngstown Sheet & Tube attorney, has been elected assistant secretary of the company. **Lewis B. Williams,** chairman, National City Bank, Cleveland, has been named to the executive committee of Youngstown Sheet & Tube Co.

• **Sidney J. Allen,** president of Allen Industries, Inc., Detroit, has been elected to the board of directors of the Detroit Steel Corp., Detroit.

• **W. J. Creighton** has retired from the office of executive vice-president of Jones & Laughlin Steel Corp., Pittsburgh, but continues in an active advisory capacity as consultant to the chairman of the board of directors. He also continues to be a director and a member of the executive committee. **Frank R. Denton,** a newly elected director, has also been elected a member of the executive committee. **C. L. Austin,** heretofore a director and treasurer, has been elected to the additional offices of member of the executive committee and vice-president. **H. Parker Sharp,** a director and general counsel, has also been elected to the additional offices of member of the executive committee and vice-president. **H. W. Graham,** director of technology, has been elected to the additional office of vice-president. **V. H. Lawrence,** heretofore general superintendent of the Otis works, has been elected a vice-president, and **W. R. Elliot,** formerly assistant general superintendent of the Otis works, succeeds Mr. Lawrence as general superintendent of that works. **W. H. Dupka,** controller, has been elected to the additional office of vice-president. **W. Randall Compton** has been appointed assistant to the president effective June 2. **W. C. Plummer,** an attorney of the corporation, has been appointed to the additional office of assistant secretary.

• **Lester O. Stearns** has joined York-Shipley, Inc., York, Pa., as manager of the residential division. Prior to joining York-Shipley, he was owner and director of Stearns Supply Co., Cleveland.

• **Samuel R. Rhoads** has been appointed manager of R. D. Wood Co.'s hydraulic machinery division, Philadelphia. He has been associated with Florence Pipe Foundry & Machine Co., the parent organization, and R. D Wood Co. since 1926, entering their employ as a hydraulic machinery designer.

• **Paul L. Reed** has been appointed Ohio zone manager of the process equipment division, Castaloy Corp. He will make his headquarters in Cleveland for the present.

• **A. N. Goddard,** founder of Goddard & Goddard Co., Detroit, has retired as president of the company. He will continue his activities as chairman of the board. **E. A. Goddard,** former vice-president and general manager, has been elected president and general manager. He has been actively connected with the company in various capacities since 1929. **L. H. Goddard** has been elected vice-president, and in addition to his new duties will continue his activities in the sales field.

RUDOLPH E. REIMER, vice-president, Dresser Industries, Inc.

• **Rudolph E. Reimer,** secretary-treasurer, Dresser Industries, Inc., Cleveland, has been elected a vice-president of the company. Mr. Reimer has been associated with Dresser interests since 1929, when he became controller of Dresser Mfg. Co., Bradford, Pa., now an operating division of Dresser Industries, Inc. He became treasurer of that organization in 1932 and in 1943 was elected secretary-treasurer of Dresser Industries, Inc.

• **Dennis F. McCarthy** has been named manager of the new tubular goods division of the A. O. Smith Corp., Milwaukee. He has been in the sales department of the company for 11 years and has been closely associated with the sale of tubular goods since 1938.

• **Clarence H. Bohmann,** formerly general foreman of the Wisconsin Motors Corp., Milwaukee, has been promoted to plant manager.

• **George W. Williams** has been elected director of King-Seeley Corp., Ann Arbor, Mich., to fill the vacancy caused by the resignation of **Wayne G. Cowell.** Mr. Williams is assistant vice-president of Detroit Trust Co.

• **Fred E. Russell** has been appointed controller for the central engineering department of Sylvania Electric Products Inc., Ipswich, Mass. He will take charge of general business and accounting in connection with the company's research, advanced development and metallurgical research laboratories in the Long Island area. He joined the company in 1943 as assistant to the general manager of lamp division operations and was formerly assistant to the vice-president in charge of engineering.

...OBITUARY...

• **Henry D. Scott,** 53, vice-president, Wheeling Steel Corp., Wheeling, W. Va., and formerly president, Sharon Tube Co., died Apr. 20. He had been chairman of the board of Sharon since 1936.

• **Jacob A. Reisinger,** 67, former executive of Carnegie-Illinois Steel Corp., Pittsburgh, died Apr. 20. He retired in January 1947, after 47 years with the Ohio works, where he was superintendent of the bessemer department.

• **George A. Merrill,** 77, former construction engineer for Stone & Webster Engineering Corp., Boston, died Apr. 21.

• **Leonard Heynemann,** 77, former sales manager of the Battery & Starter Co. Inc. of Buffalo, died Apr. 24. He retired about 2 years ago.

• **Wesley N. Spires,** 60, district sales manager of Penn Metal Co., Inc., Parkersburg, W. Va., for the states of Texas, New Mexico, and Oklahoma, died suddenly Apr. 7. He had been connected with the Penn Metal Co. for the last 10 years.

• **Bruce Shotton,** manager of the Hendrick Mfg. Co.'s Pittsburgh branch for 26 years, died Apr. 10.

• **Pell W. Foster,** 84, director of Foster Wheeler Corp., New York, and retired vice-chairman of that company, died recently.

• **Walter A. Fitzsimmons,** assistant industrial relations director for the Continental Motors Corp., Muskegon, Mich., died Apr. 27.

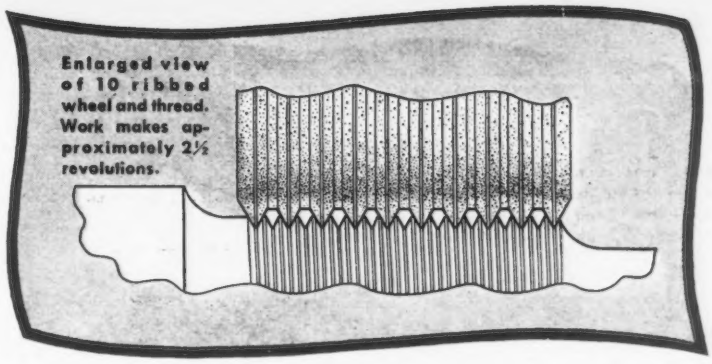
• **Leo G. Gorman,** 59, purchasing agent, Republic Steel Corp., Cleveland, died suddenly Apr. 25.

• **Angus E. Huther,** 87, founder and former secretary-treasurer of the Huther Bros. Saw Mfg. Co., Rochester, N. Y., died Apr. 24.

• **Michael Strzeminski,** 54, night superintendent and a director of the Wesley Steel Treating Co., Milwaukee, died Apr. 23 after a short illness. He had been with the firm 23 years.

• **W. W. Sherman,** 54, foundry manager of the Electric Auto-Lite Co., Toledo, died Apr. 18, following an illness of 10 months. He had been with Auto-Lite for 25 years.

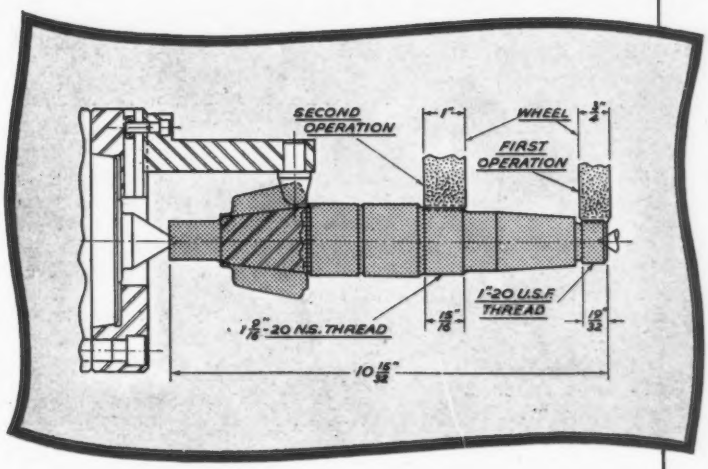
• **George S. Allen,** 77, an associate and director of Charles G. Allen Co., Barre, Mass., died recently.



HERE'S *Production* THREAD GRINDING . . .

Ground from the Solid in *15 seconds*

1"—20 N.S. THREAD, GROUND FROM THE SOLID



ON AXLE DRIVE PINIONS

"PRODUCES NEAR PERFECT THREAD"

"EXPENSIVE HAND DIE OPERATIONS ELIMINATED"

"NO MARRED THREADS ON THE ASSEMBLY LINE"

"WHEEL COST PER PIECE LESS THAN THREAD HOB AND CHASER COST"

The Timken Detroit Axle Company, prominent manufacturer of heavy truck axles, has this to say about a Jones & Lamson Automatic Multi-Ribbed Thread Grinder installed to grind the threads on axle drive pinions.

"The threads are machined as a last operation following heat treat and grinding of all bearing diameters and prior to lapping. The machine produces a near perfect thread and eliminates all expensive hand die operations along the line and overcomes marred thread on the assembly line".

". . . the grinding of threads also reduces direct labor costs and indirect cost of cutting tools and equipment".

Jones & Lamson Automatic Multi-Ribbed Thread Grinders offer remarkable opportunities for economy with better quality in the mass production of threaded parts. Ask for one of our engineers to tell you more about multi-ribbed production thread grinding.

JONES & LAMSON MACHINE COMPANY, Springfield, Vermont, U. S. A.

Manufacturer of *Automatic Thread Grinders* and Universal Turret Lathes • Fay Automatic Lathes • Automatic Double-End Milling and Centering Machines • Automatic Thread Grinders • Optical Comparators • Automatic Opening Threading Dies and Chasers • Ground Thread Flat Rolling Dies

Dear Editor:

ALUMINUM TRAILERS

Sir:

Our principals, S. A. pour l'Industrie de l'Aluminium, in Switzerland have written us that they have read an article entitled "Trailers" in the June 13, 1946 issue and ask that we obtain for them further details on the subject. . . . Their interest would naturally lie in the use of the metal aluminum.

W. S. HAMNETT
President
W. S. Hamnett & Co., Inc.
New York

● Small, aluminum overnight pleasure trailers manufactured by the Kit Mfg. Co., Norwalk, Calif., were briefly described in our West Coast column of June 13, 1946. A tear sheet is being mailed to you but for further information we suggest you write to the company.—Ed.

FOR WANT OF A SPRING

Sir:

In your Apr. 3 issue you ran an editorial entitled "For Want of a Spring." We are interested in securing 24 copies of this for distribution to our salesmen.

E. STRONG
Secretary to the President
G. F. Wright Steel & Wire Co.
Worcester

COSTS V. HARDENABILITY

Sir:

Please send me tear sheets on "An Economic Approach to Hardenability," which appears in the Mar. 27 and Apr. 3 issues.

K. G. PRESSER
Chief Metallurgist
National Supply Co.
Springfield, Ohio

TECHNICAL FILMS

Sir:

We are interested in making available to our own and neighboring plant personnel here in Riverside periodic showings of technical films relating to any phase of science or processing of any base industry which would be of interest to technical workers and engineering students . . . Any "whom to contact" information you can furnish us will be appreciated.

M. I. OMLOR
Personnel Dept.
Hunter Engineering Co.
Riverside, Calif.

● The Bureau of Mines has an extensive library of educational motion pictures which are available for free showing to schools, scientific groups and civic clubs which are equipped to show 16-mm sound films. Applications for free, short-term loan of the films should be addressed to the Graphic Services Section, Bureau of Mines, 4800 Forbes St., Pittsburgh 13. Also, almost any leading industrial company in any field in which you might be interested has one or more very good technical films that they are usually glad to loan to such organizations as yours. You have to get on schedule at least a month ahead of the date of showing to assure getting the film the exact day you want it. We are forwarding a short list of companies having excellent technical films and suggest you write their advertising departments.—Ed.

DR. PETER SCHOENBERGER

Sir:

I have not seen your magazine, but from its title I judge it concerns the steel industry. I am endeavoring to gather biographical data about Dr. Peter Schoenberger, who in early days was one of the most prominent iron masters in the state of Pennsylvania. I have learned that Dr. Schoenberger came to America in 1785 and in 1817 erected his first furnace in Blair Co., Pa. The Pennsylvania histories mention his scattered furnaces—he named them for his daughters — and coal banks. In Cincinnati, Ohio, two of his sons acted as business agents.

I would like to learn when and where Dr. Schoenberger was born; how he acquired the title Doctor; if he was a medical doctor what influenced him to become an industrialist and what success he achieved. What did he contribute to the steel industry, etc. Can you aid me in this search or direct me to someone who can?

THELMA M. MURPHY
44 S. Dearborn St.
Indianapolis

● We do not have any information on Dr. Schoenberger, as THE IRON AGE was not published until 1855. The best series of books on early metalworking activity were those prepared by Swank, but they covered activities at a considerably later date than 1817. Records as far back as that are scarce and widely scattered, but we believe the Pennsylvania Historical Society at Harrisburg has considerable data on early metalworking activities. It is probable that by digging into the material available there you could gather enough information to give you the answers you desire. We believe you are going to have to do considerable research using a great deal of widely scattered and unindexed reference material, unless by chance, one of our readers can furnish information that could be of value to you.—Ed.

FOIL SLITTING MACHINES

Sir:

We note from the Apr. 10 issue, an article on p. 123 showing Waldion foil slitting equipment. We are interested in obtaining more detailed information on this machinery but are unable to locate an address for the Waldion Corp. and are wondering if this should be the John Waldron Corp., New Brunswick, N. J., since they make slitting machines . . .

M. R. WARREN
District Purchasing Agent
Aluminum Co. of Canada Ltd.
Kingston, Ontario

● You are correct. The name should read Waldron.—Ed.

FINANCIAL ANALYSIS

Sir:

Kindly mail to our Washington office 10 copies of the "Financial Analysis of the Steel Industry for 1946-45" as shown in the Apr. 10 issue . . .

B. C. STEPHENS
Kaiser Co., Inc.
Oakland, Calif.

NONFERROUS SPECIFICATIONS

Sir:

We have one of your "Non-Ferrous Alloy Specifications" booklets which we find very useful in our particular line of business. I would appreciate it if you would forward to us 10 copies of this booklet at your earliest convenience.

J. L. STEVENS
Chase Brass & Copper Co. Inc.
Philadelphia

● "Non-Ferrous Alloys Specifications" is available at 25¢ each or 16¢ for five or more copies. Your copies have been sent. —Ed.

PLASTIC PATTERNS

Sir:

We have come across a reference to an article in your Nov. 15, 1945 issue on p. 54-59, entitled "Precision Casting With Plastic Patterns." I should like to have tear sheets of that article.

HIRAM BROWN
Resident Chief Metallurgist
Solar Aircraft Co.
Des Moines, Iowa

TEAR SHEETS FOR GERMANY

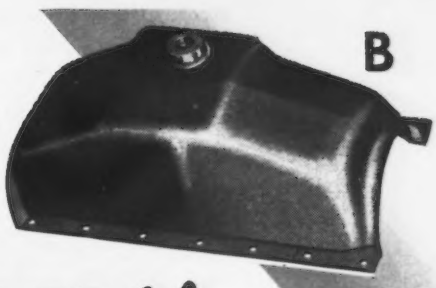
Sir:

I am writing a book on the measurement of surface roughness, waviness and physical properties. I should like to review the international publications on this subject in my new book. I have found several articles in your journal, published in 1939-40, but suppose that others on surface measurement have been published by you since that time. Unfortunately it is impossible to get the volumes of your journal in Germany this day, therefore I should be much obliged if you would send me any reprints of your new articles on this subject.

JOHANNES PERTHEN, Dr. Ing.
15, Rumannstr.
(20) Hannover, Germany
British Zone

● We are forwarding copies of four articles which we have published on the subject of surface finish measurement, and hope you will find this information valuable in your review.—Ed.

T&W



Manufacturers' Money Clip

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A— *Oil Pan for marine engine—produced in one draw from 16 gauge material with bell housing reinforcement 11/32" stock; 33-1/8" long, 11" wide, 4-3/4" deep.*

B— *Pan for 4-cylinder Diesel—redesigned from aluminum casting, produced in two draws from 16 gauge material with bell housing and reinforcement 9/32" stock; 19-25/32" long, 10-7/8" wide, 7" deep.*

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Industrial News Summary...

- ***High Steel Output to Continue***
- ***Market Enters More Normal Phase***
- ***Ingot Rate to Rebound to 96 Pct***

THERE was no indication this week that the steel industry will be lacking the orders to keep operations at unusually high levels for the rest of this year. The possibility of a slight industrial setback has been so well advertised that preventive measures have already been taken by many producers and consumers.

Metalworking customers were still clamoring for steel this week but inventories were being closely watched and controlled—something that was not too general in prewar years. For the first time since the war ended the steel industry appears to be entering a normal business period of activity.

Backlogs are large but most of these unfilled orders will be filled by orderly schedules between now and the end of the third quarter. Carryovers—unfilled promises which raised hob with production schedules last year—are on the wane and may disappear within the next few months unless a coal strike occurs.

The honeymoon in the sellers' market from a metalworking standpoint appears to be over, even though delivery promises which are firmer today than at any time since the war ended run beyond 3 months on many products. Sales forces are busy getting acquainted with prewar sales technique and by fall the most active campaigns of this nature are expected to pay dividends to those steel firms who have been building up better customer relationships.

STEEL executives report continued pressure for deliveries but admit that it is of a different nature than has been the case in past months. Steel promised to consumers for the balance of this year will neatly fall in line and be taken care of on mill schedules. Consumer pressure being exerted this week comes from those who have been assured they will get their supply and the only question is, "Will I get it on time?"

Major sore spot in the steel supply picture involves flat-rolled products. On an allocation basis, however, supplies are being divided as fairly as possible and specified delivery dates are being adhered to. Large steel consumers say that mills have been prompt in the past few weeks on prior delivery commitments. Third and fourth quarter quotas are not expected to be less than second quarter allotments and may be more.

That the metalworking industry is in a "transition" period was proved this week by the shutting down of a few plants due to lack of steel, while other channels were reporting a falling-off in the demand for consumer goods made from steel. In spite of this there is more optimism among manufacturers over the availability of metals than has been the case in the past year or so.

Many fabricators have eliminated entirely the policy of taking any and all steel they could get. Production schedules now reflect an attempt to reduce unbalanced inventories as rapidly as possible. New ordering involves primarily short items. This trend will become more marked as consumers' goods manufacturers meet customer sales resistance.

LARGE makers of consumer goods such as household appliances are more than a trifle worried over inventories of finished products which in most cases are somewhat higher than in the fourth quarter of 1946. Total inventories in some quarters are up as high as 70 pct over last September. Refrigerators in one instance were far above the average inventory for all consumer products handled by that industry; radios were up even more.

The pipeline in the washing machine field was said to be full and, in isolated cases, orders have been cut back to part suppliers. There was every indication this week that the next 60 days will present a severe test both to distributors and manufacturers of general household appliances. Just how well these inventories are dissipated will be an indication of how heavy steel orders from these consuming groups will be later on this year.

Demands for steel products from the automotive field, from heavy machinery makers and for industrial construction are expected to be at peak levels for the rest of this year. Despite the cancellation of some construction business and the slowing down of new projects because of high prices, backlogs of many large fabricators are running ahead of the volume in hand during the same period last year.

THE steel ingot rate this week is at 91 pct of rated capacity, down 3½ points from last week's revised figure of 94.5 pct. Most of the loss is due to a shutdown at a major steel mill's plants in the Chicago district where a contract was expected to be signed this week, thus ending the walkout. Aside from these temporary setbacks there is nothing in the current picture except the definite probability that the rate will soon be back to 96 pct or better.

Scrap markets this week appeared to be stabilized, for the time being at least, at most major markets. A decline occurred at Chicago which took THE IRON AGE scrap composite down to $29.75 a gross ton, a drop of 17¢ from last week's figure of $29.92. There were no major changes this week at Pittsburgh and Philadelphia.

It appears that steel company depreciation reserves set aside for equipment replacement may be at least $130 million short of the amount needed to complete plans for plant expansion and machinery replacement this year. First quarter experience has proved that figures set up in the past to cover the cost of new equipment and additional facilities will have to be revised sharply upward.

• **DETROIT EMPLOYMENT**—A survey of 1231 manufacturing plants in Michigan employing 65 pct of the manufacturing employment in the state shows that the number of production workers increased 1 pct from February to March, according to the Michigan Commissioner of Labor. Average weekly wage for a work-week of 40 hr in the automobile and parts industry was $56.99, according to the survey. Employment in the automobile industry rose 1.7 pct from February to March. Based on returns from 151 automobile and automobile parts plants, employment was up 59 pct during March as compared with March 1946, while weekly payrolls increased 114.1 pct as compared with the same month a year ago. Average hourly earnings for the automobile and parts industry for March 1947 was $1.425.

• **FRENCH OUTPUT**—March finished steel output in France totaled about 396,000 tons, about 22,000 tons more than the 1938 average. The output was achieved with 176,000 tons less of coal than the prewar consumption due to the increased use of scrap in both blast furnaces and openhearths, and electric furnace output increased 145 pct over the prewar average. Due to the shortage of coke, French blast furnaces operated at 81 pct of the 1938 average during March, producing 314,000 tons during the month. Conversion of furnaces to oil firing in France is proceeding somewhat more slowly than had been expected.

• **WASHER SALES**—Factory sales of household washers in February reached a new high of 271,338. This compares with 89,308 in the same month of 1946, and is 12 pct above the January 1947 total of 240,233, according to industry sources.

• **VETO EXPECTED**—Legislation outlawing practically all pending portal pay suits as well as future actions was sent to the White House last week. Amid strong indications of a veto, the House and Senate approved the measure which would permit compromise of existing or past portal claims and remove jurisdiction from the courts to hear claims which were not compensable either by contract, custom or usage. In general, future claims would be barred unless they were based on firm contracts or were recognized as past custom or practice.

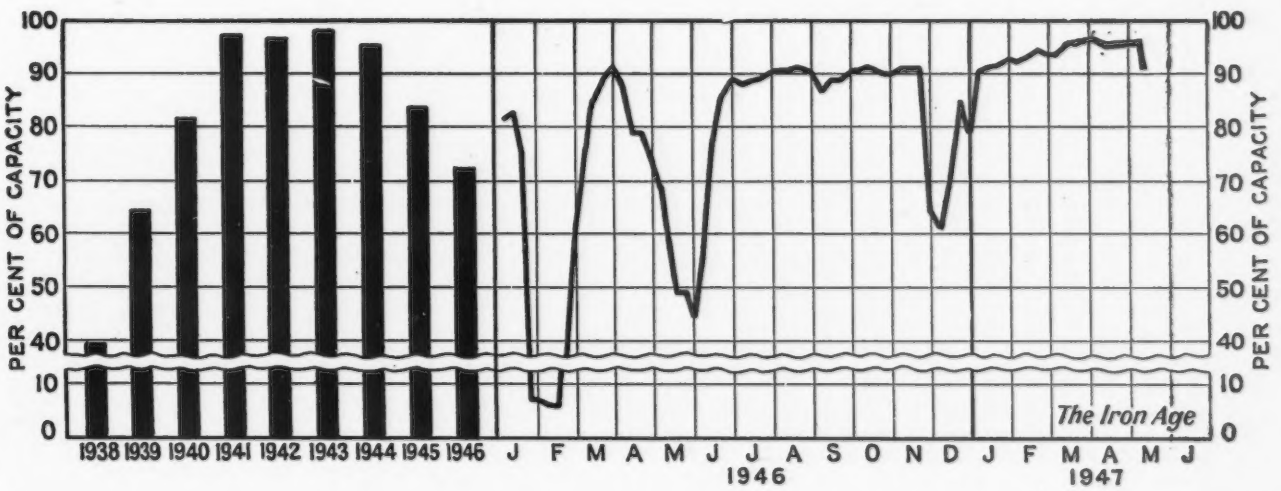
• **DIVIDED OPINION**—Defendants in the government antitrust suit against 47 western railroads contend that application of the Sherman Antitrust Act to a regulated industry is not the same as applying the act to unregulated businesses. The new theory, the roads say, assert that rates must be competitive yet no such standard is contained anywhere in the Interstate Commerce Act under which rates are established. If the regulation of freight rates is to be divided between two bodies, the roads point out that the Dept. of Justice would then have to judge the rates set through Interstate Commerce rules by Sherman Act standards. This, they imply, defies any correlation by even the most astute legal minds, Philadelphia or anywhere.

• **AUSTRIAN TINPLATE OUTPUT**—Present output is at the rate of 16,000 tons per year, compared with a peak production of 55,000 tons in 1942. Estimated requirements for the Austrian home market are said to be about 88,000 tons. The Schmidthutte Krems mill has been largely dismantled, and the works is producing at about 8000 tons per year, whereas it was producing the bulk of the 1942 output. The balance of current production is from the mill at Kreigslach, which resumed production a year ago at about 30 pct of prewar capacity.

• **DETROIT ARBITRARY**—Cold-finished bars which up to Apr. 1 this year were priced on an f.o.b. Detroit basis now carry a Detroit arbitrary delivered price. Bars are now $3.35 per 100 lb delivered Detroit and $3.40 per 100 lb delivered other eastern Michigan points.

• **BELGIAN RAIL PLANS**—The Belgian railways have ordered 10,000 freight cars at a total cost of 1750 million Belgian francs ($40 million). The number includes 6000 coal cars, and the balance of an assortment of other types. Hopper cars, of all welded steel construction, and some large tank cars will also be delivered by Belgian builders to France. Electrification plans for the Belgian state railways provide for the conversion of 1460 km (906 miles) of trackage at a minimum cost of 13 billion Belgian francs ($295 million). This conversion should permit an annual saving of 65 pct of the coal consumed at present by the system (715,000 tons). This figure is equal to one week's output of the entire Belgian coal mines.

Steel Ingot Production by Districts and Per Cent of Capacity



Week of	Pittsburgh	Chicago	Youngstown	Philadelphia	Cleveland	Buffalo	Wheeling	South	Detroit	West	Ohio River	St. Louis	East	Aggregate
April 29.....	102.0*	87.0*	93.0*	90.5	100.0*	102.0	100.0	99.0	102.5	94.0	103.0	73.0	95.0	94.5*
May 6.....	102.0	77.0	92.0	90.5	97.0	102.0	90.0	99.0	102.5	97.0	98.0	70.0	95.0	91.0

* Revised.

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Steel Officials Concerned Over Inadequate Depreciation Reserves

New York

• • • **Steel company officials** are weighing high first quarter profits against the inadequate depreciation reserves set aside for equipment replacement. It appears that these reserves will be at least $130 million short of the amount needed to complete plans for plant expansion and machinery replacement this year. And some officials believe that the $130 million estimate may be too low because it is based on first quarter experience; there may be further equipment price increases dictated by the current series of wage agreements.

By law, depreciation reserves are set up on an acquisition cost basis but many replacement costs have soared to two or three times the original costs. Reserves for some facilities are said to be only one-fourth of current replacement cost.

The steel industry planned to spend $448 million this year for new equipment and additional facilities, according to the American Iron & Steel Institute. But these figures were prepared by the steel companies at the end of 1946 and early in 1947. First quarter experience indicates, according to individual companies surveyed, that the figure will have to be sharply revised upward. New wage increases by equipment manufacturers may force the figure even higher.

Irving S. Olds, U. S. Steel Corp. board chairman stated last week that plant additions and improvements in the first quarter of 1947 cost his company about $31 million. This expenditure, he declared, due largely to present day costs being greatly in excess of prewar costs, is approximately $11 million greater than the amount recovered in the period through depreciation on facilities installed in earlier years at lower costs.

On this basis observers estimate that the nation's steel companies will have to take about $130 million out of 1947 profits—or out of surplus — to pay for improvements scheduled for this year—even assuming no further equipment cost increases.

Bethlehem's board chairman, Eugene G. Grace, has also stressed the need for setting aside larger sums to pay for replacement and expansion of facilities, pointing out that today's replacement costs were two or three times what they were before the war.

1947 Replacement Bill Seen As Higher by $130 Million Due To Cost Increase

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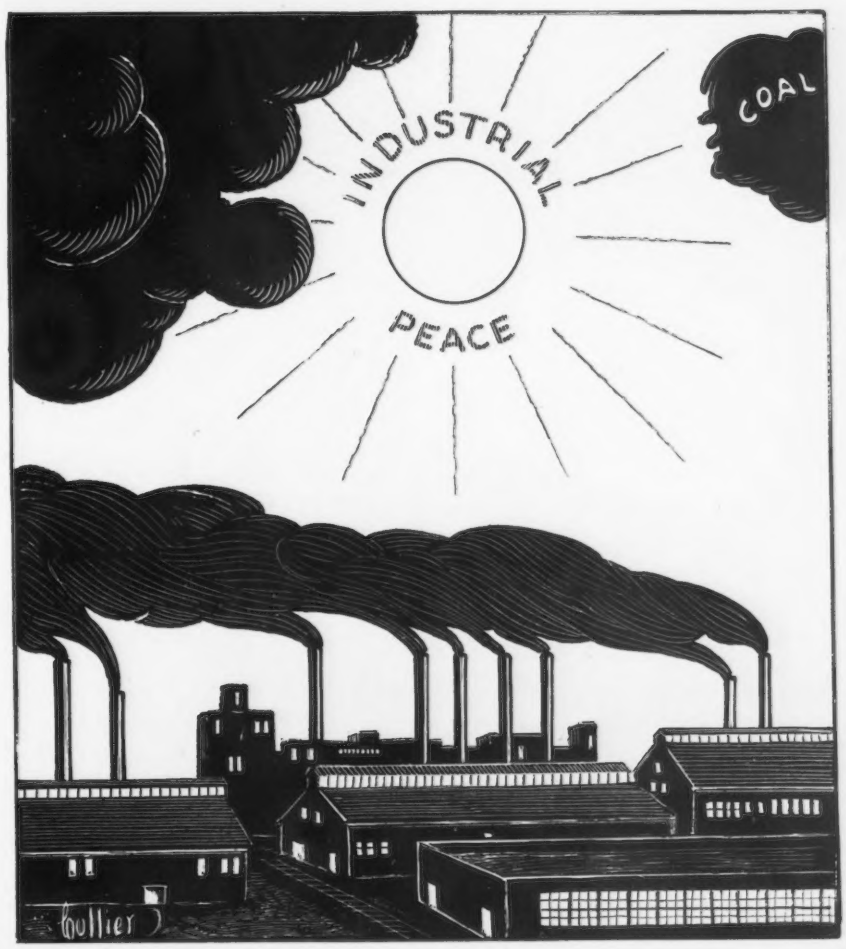
By G. F. SULLIVAN
Ass't News Editor

o o o

Last week a Republic Steel Corp. spokesman pointed out that current construction cost is two or three and a half times the original cost of many of its furnaces and mills and depreciation allowances fall far short of reproduction costs.

Frank Purnell, president, Youngstown Sheet & Tube Co., asserts that as to many of his company's units "the reserve is less than one-fourth the replacement cost." Commenting on the Youngstown position, Mr. Purnell declared that "the need for substantial savings to create a surplus for these purposes (replacements) in addition to a fair amount for dividends is an absolute necessity if the company is to continue to meet its obligations to its shareholders, its employees, its customers and the country."

He pointed out that because of inflated construction cost and high tax rates, investment capital is not available as it once was for expansion or increase of capacity. "We



must finance these items largely from our own reserves and surplus," Mr. Purnell said.

A report by the Machinery & Allied Products Institute, Washington, dated May 1, uses government figures to show that industrial equipment prices increased only 28 pct from 1939 to March 1947. By comparison, wholesale prices in that period rose 94 pct for all commodities, raw materials were up 133 pct and manufactured products were 79 pct higher. Much of the huge increases concerning the steelmakers would therefore appear to be in the construction rather than the new equipment category.

•

New York

• • • **U. S. Steel Corp.** shipments in the first quarter of 1947 approached the peacetime high of the previous quarter and totaled 4,843,674 net tons, according to Irving S. Olds, chairman. The quarterly average ingot rate was 97.9 pct of capacity; current production is at a still higher rate. Last week, ingot operations of the corporation were 100.7 pct, up from the previous week's 98 plus.

Even at these high rates of production, Mr. Olds estimated that unfilled orders on hand would require 5 months' production to fill. However, he was pessimistic about the prospects for uninterrupted production by the corporation if there should be another coal strike when the mines are returned to the operators on June 30. The corporation's earnings appear below.

•

Cleveland

• • • **Republic Steel Corp.** in the first quarter of this year had a net income of $11,516,795 after providing $8.8 million for taxes. This contrasts with a $347,412 loss in the strike-marred first quarter of 1946.

Calling this a reasonable return on investment the report declared that throughout the war and continuing into 1946 many of the company's important products were sold below cost and earnings were "entirely inadequate." From 1942 to 1945 inclusive, the company continued, earnings were only 2.3 pct on sales and 4.7 pct on its investment. Referring to the new wage scales, it declared that "only high productive efficiency and an absence of strikes will make it possible to absorb these additional wage costs without an increase in selling prices."

•

Pittsburgh

• • • **National Steel Corp.** reports net income, after all charges, for the quarter ended Mar. 31, 1947, of $7,325,058, equal to $3.28 per share on 2,230,642 shares. This compares with earnings in the first quarter of 1946 of $2,083,356. equal to 94¢ per share on 2,206,642 shares. Earnings in the fourth quarter of 1946 were $6,520,331, equal to $2.92 per share.

•

Chicago

• • • **Inland Steel Co.**, according to Edward L. Ryerson, chairman, earned $7,995,857 in the first 1947 quarter before deducting $2,800,000 credited to contingency reserves. He compared this with the net income for the first quarter of 1946 of $1,046,958. Mr. Ryerson said that earnings for the first quarter of 1947 were favorably affected by the consumption of raw material inventories which were obtained at costs substantially lower than those which will govern purchases for the second quarter of this year. The profit therefore for the period has been significantly greater than would otherwise have been realized, the chairman said. He also pointed out that the rate of operations for the first quarter of 1946 was 63.6 pct while the first quarter of this year was 99.4 pct.

•

Pittsburgh

• • • **Jones & Laughlin** Steel Corp. reported net earnings of $6,337,132 for the 3 months ended Mar. 31, 1947, as against $813,246 for the same period of 1946. Total earnings for 1946 were $10,854,000.

Sales and operating revenues for the quarter totaled $78,263,438, as against $42,013,918 for the first quarter of 1946.

•

Portsmouth, Ohio

• • • **Portsmouth Steel Corp.** earned $2,170,000, or $1.64 per share for the first 9 months of operation which began July 1, 1946, Elmer A. Schwartz, Portsmouth president, told shareholders at their first annual meeting.

Mr. Schwartz said the company was shipping currently at the rate of $45 million a year and that it had orders on hand for practically all available tonnage for the balance of the year.

•

Middletown, Ohio

• • • **American Rolling Mill Co.** for the quarter ended Mar. 31, 1947 earned $5,918,876 after all charges, equal to $1.76 per share. Armco's consolidated net earnings for the first quarter of 1946 were

(CONTINUED ON PAGE 130)

U. S. Steel Corp. Earnings in Brief

ITEMS	First Quarter 1947	Fourth Quarter 1946	Third Quarter 1946	Year 1946*	Year 1945
Net Income	$39,234,511	$31,215,636	$33,329,353	$88,683,530	$58,015,056
Dollars Per Share	$3.78	$2.86	$3.11	$7.29	$3.76
Sales in $ Millions	$475	$472	$410	$1485	$1740
Shipments—Net Tons	4,843,674	4,902,742	4,457,557	15,247,752	18,410,264
Percent Ingot Operations	97.9	87.4	94.3	72.9	82.0
Average Employees	275,961	276,237	276,793	266,727	279,274
Total Payroll	$199,675,743	$195,746,115	$194,888,029	$694,114,463	$786,721,918
Average Pay Per Employee	$724	$709	$704	$2602	$2817
Percent Payroll to Sales	42.0	41.8	47.6	46.7	45.2
Net Income Per Ton of Shipments	$8.10	$6.37	$7.48	$5.82	$3.15

* Steel Strike in 1946 for about 1 month with complete shutdown except maintenance men.

Additional Basic Steel Firms Sign New Wage Agreements

New York

• • • **Additional wage contracts** were signed by basic steelmakers last week. Allegheny Ludlum Steel Corp. took the lead on the social aspects of the new agreements with a provision that they would foot the entire bill for the social security package. They inaugurated the latter last year but during that time it was a mutually contributory affair. Many other steel firms, including U. S. Steel Corp., must first make a study of the social package before it becomes operative.

Early this week workers at Inland Steel Corp. were still on strike but a contract was expected to be signed momentarily. Stumbling block centered on seniority since economic and social features had been agreed upon.

The American Rolling Mill Co. in reaching agreements with its employee representatives granted an across-the-board average wage increase of 16½¢ an hr, compared with other contracts calling for 12½¢ an hr. Included among other firms which signed with the United Steel Workers of America were Bethlehem Steel Co., Republic Steel Corp., and many steel processors and fabricators.

Many small steel firms and steel fabricators have criticized the basic steel wage contract on the count that it is really an industry-wide agreement — they say they are forced to sign the contract without being able to negotiate with the union on purely local issues. Some of these plants are shut down by strikes pending an agreement.

Five Youngstown fabricating firms have joined in protest against the wage tactics which they say are being applied against so-called "nonbasic" steel concerns by the USWA. These companies have asked the Senate to hasten action on that provision of the House labor bill which would outlaw industry-wide collective bargaining.

•

Pittsburgh

• • • **The 2-year agreement** between Allegheny Ludlum Steel Corp. and the USWA signed here early this week was said by Hiland G. Batcheller, president of the firm, and William Hart, union official, to be "the most liberal the union has ever negotiated with a basic steel producer."

Allegheny Ludlum Takes Lead In Social Features; Armco Raises Ante on Wages

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They added, "Under the new contract the company will bear the full costs for each worker of a $4000 life insurance policy in addition to a $4000 accident policy and coverage for sickness, hospitalization and surgical benefits. Families of the workers will be covered on hospitalization, including maternity care."

A year ago the firm started the insurance program which was paid for jointly by the company and the employees. It was said that the cost of the social schedule would be about 4¢ an hr for each employee. The added economic benefits plus a 12½¢ an hr increase will expand the average take-home-pay by more than 20¢ an hr according to the company and the union. Wage equality for women workers was also provided.

•

Middletown, Ohio

• • • **American Rolling Mill Co.** has reached wage agreements with representatives of 11,000 employees in the company's plants at Hamilton, Middletown, Zanesville, Ohio, and Butler, Pa., according to Charles R. Hook, Armco president.

"Armco employees in these plants will receive an across-the-board average increase of 16½¢ per hr, or $1.28 per day, retroactive to Apr.1, 1947," he stated. "This does not include the additional cost of fringe issues.

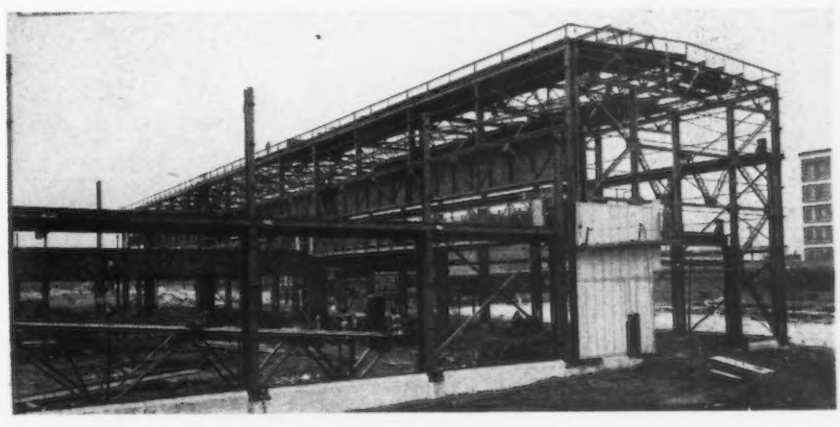
"The new minimum basic rate for regular Armco employees becomes $1.14 per hr compared with the former rate of 96½¢. The base rates of employees receiving more than the minimum will be increased from 15¢ to 17¢ per hr, an average of 16¢. . . . "An increase of 13½ pct has been granted Armco salaried employees, effective retroactively to Apr. 1," he said.

Disagree on 5-Day Week

London

• • • **Differences of** opinion are reported among members of Britain's National Coal Board regarding the wisdom of introducing a 5-day week in the pits at the present time. It is understood that the production members, Sir Charles Reid and T. E. B. Young, took the view that it should be postponed until the fuel position is more assured, and that Lord Citrine, who is responsible for manpower and welfare, and Ebby Edwards, who is in charge of labor relations, disagreed and that Mr. Shinwell supported them.

U. S. STEEL WAITS FOR STEEL: *Construction of the new St. Louis warehouse for U. S. Steel Supply Co., scheduled to start early in 1945, finally got under way this spring. A shortage of steel accounted for the delay!*



WAA Reports Disposal Of $437 Million U. S. Nonferrous War Plants

Washington

• • • **Slightly more** than half of the surplus aluminum and other nonferrous metals plants have been disposed of to date, according to figures made available by WAA. Some $437 million worth of the total $761 million invested by the government have been sold or leased.

Aluminum plants having an original cost of $654 million have been declared surplus and $388 million worth disposed of; of the $107 million worth of copper, brass and other nonferrous metals plants, plants costing $50 million have been sold or leased. The most noteworthy disposal in this group was the sale of the brass mill at Indianapolis to the Bridgeport Brass Co. for $3,653,000.

Virtually all of the aluminum plants capable of peacetime operation have been turned over to private enterprise, officials said. Included in the $277 million worth remaining are five reduction plants which are located in areas where economical electric power is not now available. Disposal of these will depend largely upon prospects for obtaining electric power at considerably lower rates.

Such aluminum fabricating plants as are still held by WAA are those designed to produce extrusions, castings and forgings for specific war purposes and have little or no peacetime adaptations.

Governed by the existing anti-monopoly laws and the policies of the Justice Dept. which must approve large sales, WAA endeavored through its disposals to widen competition in the aluminum industry. A court ruling in 1945 held that Alcoa had had a monoply in the production of primary alumina in 1940 and strongly implied that unless competition was promoted through disposal of government plants it might be necessary for the Dept. of Justice to look toward forcing dissolution or reorganization of some Alcoa properties in the postwar period.

As a result, key aluminum plants for alumina production, reduction and fabrication were sold to Reynolds and Permanente (Kaiser) whereupon Alcoa's ratio of production to total capacity was reduced by at least 40 pct.

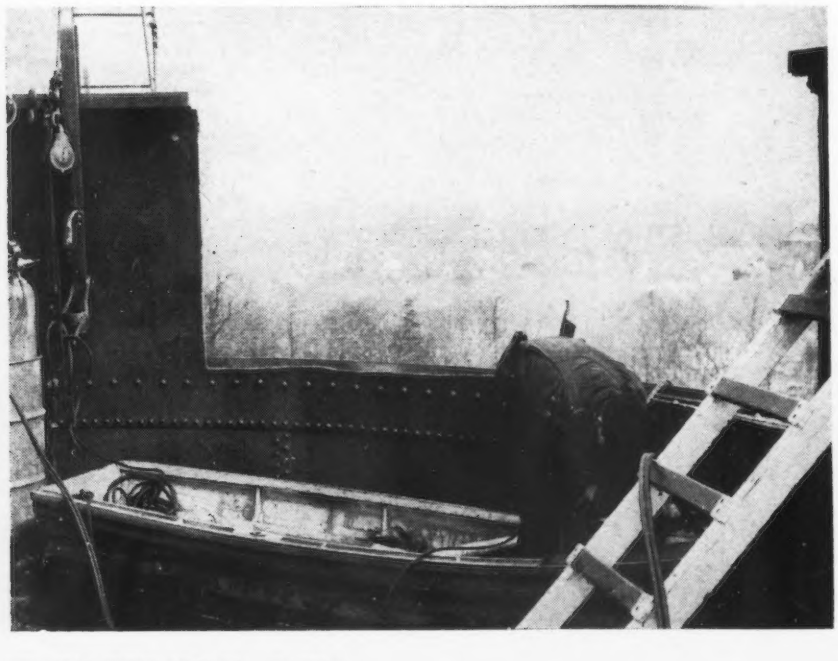
Since it devolved upon WAA to assist in helping the newer entrants into the field to become established on a profitable basis, in the case of leased plants the disposal agency fixed a schedule of moderate but constantly increasing rentals which reach a straight commercial basis after four years.

Although no government-owned plants for production of magnesium have been disposed of, WAA said, only a few fabricating plants remain on its hands and these are of relatively small value.

The agency is finding many complications in the disposal of such plants. Not only are privately operated plants running at approximate requirement levels but no more than three of the government plants are seen as being capable of profitable production under private ownership.

Consequently, most magnesium plants which are not sold at prices permitting extensive expenditures by new owners for converting to other types of production will probably have to be maintained for the present by the government on a standby basis.

BURNER IN A BOAT: *Wreckers floated two rowboats in this old 120-ft standpipe at Erie, Pa., letting out the water as they cut off sections. The city got $900 for the obsolete standpipe as it stood, while subcontractors, who thought up the rowboat idea got $2300 for taking the pipe down and did the job in about 3 weeks.*



AIME Plans Nonferrous Meeting in New England

New York

• • • **The first** Institute of Metals regional conference of the American Institute of Mining & Metallurgical Engineers is scheduled for May 23 and 24. All new England technical societies are cooperating in the meeting which will have its headquarters at the Hotel Sheraton. Spokesmen for the institute believe it will be one of the most valuable ever held for nonferrous metallurgists.

More than a dozen 10-min talks on new nonferrous developments will be given on the first day, followed by a discussion period. The dinner will be addressed by Clyde Williams, AIME president and director of Battelle Memorial Institute. The second day will be devoted to technical sessions.

Members of the committee responsible for the meeting are:

H. I. Dixon, Sterling Alloys, Inc., chairman; R. S. French, Bridgeport Brass Co., vice-chairman; Geo. P. Swift, consultant, Waltham, Mass., treasurer; Morris Cohen, MIT; John Wulff, MIT; Daniel Cushing, consultant; Galen Clevenger, U.S.S.R.&M. Co.; C. R. Sutton, consultant; John Christie, Handy & Harman; Sam Spalding, American Brass Co.; Alan Morris, Bridgeport Brass Co.; and A. Phillips, Yale University.

Proposed Third Quarter Tinplate Export Quota Is Set at 140,000 Tons

Washington

• • • **Discussion of** a proposed third quarter export quota of 140,000 tons of tinplate centered around a meeting on Apr. 29 of the Tinplate Industry Advisory Committee with representatives of CPA and the Departments of State, Agriculture and Commerce. Of the total, CPA officials said that 120,000 tons was proposed for food preservation abroad, supported by CXS symbols. This would require tin mill acceptance. Acceptance of the remaining 20,000 tons for export would be optional with the mills.

It was stated that if all orders for the proposed export quota are accepted, it is expected that 10,000 tons would be used for packing foods to be returned to this country. The remaining 10,000 tons would go for other uses. Including rated and unrated tonnages, second quarter export totals are 120,000 tons.

It was brought out at the meeting, presided over by Frank T. McCue, chief of CPA's Steel and Tinplate Branch, that the Office of International Trade, Dept. of Commerce, had received foreign requests for 240,000 tons of tinplate for the third quarter. In view of domestic demand and the critically short world supply of pig tin, government officials said it was out of the question to license this quantity for export.

Erwin Vogelsong, Chief of CPA's Tin, Lead & Zinc Branch, reported that the latest estimate for 1947 world pig tin production, reached by the international tin study group, which met in Brussels, Belgium, recently, was 117,000 tons, a drop of 2,000 tons from previous expectations. Mr. Vogelsong said that at the present rate of consumption in this country (roughly 72,000 tons a year), government stockpiles of pig tin will be exhausted before Jan. 1, 1948, and that it might be necessary to reduce somewhat the 32,000 tons now earmarked for tin mill production in the United States during the current year.

Third quarter U. S. tin mill production was estimated by CPA at 996,000 tons, a figure which industry members were inclined to regard as over-optimistic.

Lucius F. Foster, Deputy Commissioner for Civilian Production, reported that export shipments in the first quarter were considerably less than allocations for the period, and expressed concern over the possibility that this backlog might increase over the next 2 months, throwing an added burden on mills during the third quarter.

Industry committee members, together with the export managers of their companies were scheduled to meet with officials of the Office of International Trade in Washington next week, to review OIT's licensing procedures.

May Build Argentine Plant

Pittsburgh

• • • **G. D. Thompson,** president and board chairman of Pittsburgh Steel Foundry Corp., returned from the Argentine last week with the news that his company is interested in building a steel rolling mill for that country. "Argentina has the manpower and the raw materials are available with which to increase substantially her production."

The foundry and machine company president declared that his firm could build a steel rolling mill in Argentina and have it producing within 18 months after construction was started. Two of his engineers remained in the Argentine to discuss the matter further with government officials, Mr. Thompson said. He added that the proposed plant would be government operated, producing basic steel for sale to finishing mills as ingots or billets.

Buys Core Shop, Foundry

Washington

• • • **Cooper - Bessemer** Corp., Mount Vernon, Ohio, has purchased for $237,000 the core shop and foundry it operated in that city during the war for the production of gasoline and diesel engines and air compressors. In announcing the sale, WAA said that the property will continue as a core shop, keeping employed about 1000 workers.

LITTLE JOE AND THE KATYDID: *Newsmen inspecting some of the Navy's non-secret efforts in the guided missile field at its test station at Point Mugu, Calif. In the foreground is Little Joe, an antiaircraft missile; behind it are a radio controlled target drone, the Gargoyle, an air-to-ground guided missile; another drone; an adaptation of the Nazi's V-1 buzz bomb, which the Navy calls the Loon; the Gorgon, a remote control antiaircraft missile; and Katydid, one of the Navy's new jet powered target drones.*

Electric Furnace Alloy Steel Output Far Below Rated Capacity

Pittsburgh

• • • **The war demand** for electric furnace steel, especially of the nonstainless type, has not been sustained into the postwar period as was anticipated by many observers a few years ago when electric furnace capacity was boosted sharply. This is neither the fault of the product nor the industry, but is largely a matter of economics. While the operating costs of electric furnaces have been reduced because of technical advances, they still are not comparable to openhearth furnace operating costs. This difference in operating costs has been covered by the steel industry by means of a $10 a ton differential or premium for electric furnace steel.

Technical Advances in Electric Furnace Melting Practice Unreflected in Prices

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By T. E. LLOYD
Pittsburgh Regional Editor

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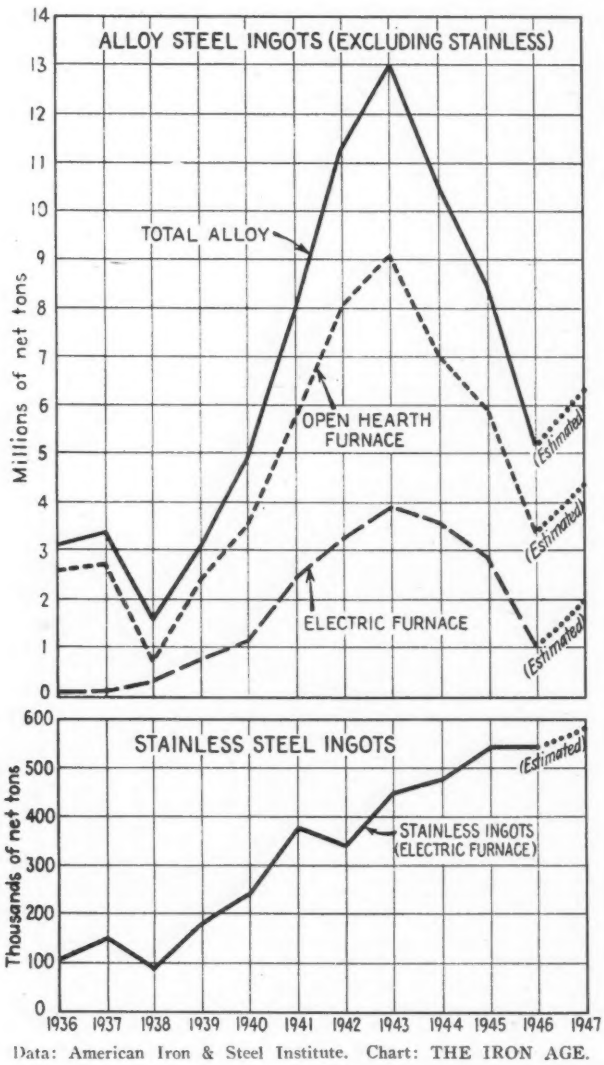
In 1939, 75 pct of the alloy steel other than stainless output was openhearth steel. This percentage declined through the war years, but even in 1944, when the electric furnace expansion program was completed, openhearth furnaces accounted for 66 pct of the alloy steel output. In 1945, the downward trend for the openhearth reversed itself and 67 pct of nonstainless alloy steel ingot production was a product of the openhearth furnace.

Stainless steels are another matter. Because of their nature, they are totally an electric furnace product, and production of these steels has been rising steadily through the war and postwar years. From present indications 1947 should be the biggest year in history for stainless steel production.

Both alloy and stainless steel are currently in better supply than carbon steels. Some specific products are in short supply, but the capacity for producing these steels was boosted so much during the war that ingot capacity is not a limiting factor now. Except for specific products, where finishing capacity is the main limiting factor, fair deliveries can be had on both alloy and stainless steel items and supply is getting better every month.

It was believed by many observers during the war that the $10 a ton differential for electric furnace steels would be dropped once the war was over because of competition with openhearth alloys and carbon steels and because greater economies in electric furnace steelmaking would make this feasible. Once or twice during the past 2 years, certain steelmakers have held bargain sales, dropping the $10 electric furnace differential to get certain business, but the move has not been industry-wide and there doesn't appear to be any indication that such action is anticipated.

While there has been an easing in demand for alloy steel, as shown in the graphs, ingot production of alloys and stainless for 1947 should be better than 1946.



Data: American Iron & Steel Institute. Chart: THE IRON AGE.

On the basis of current trends, alloy ingot production in 1947 should run about 1 million tons better than 1946, and stainless ingot production should be likewise increased. The bulk of the increase in alloy production will likely be openhearth steel, despite the possibility of idle electric furnace capacity.

It was anticipated by many that the expansion of electric furnace capacity during the war would have a serious depressing effect on the construction of electric furnaces after the war. From the standpoint of electric capacity expansion in the steel industry proper, this is partially true. However, builders of electric furnaces have been looking forward to a great deal of business from foreign sources, and a considerable amount from domestic foundries who face the necessity of modernizing their melting equipment.

Some furnace manufacturers have felt for a long time that the trend toward larger electric furnaces would obsolete some of the electric steelmaking capacity in this country. The trend toward larger furnaces is slow but definitely perceptible. With few exceptions, however, steelmakers have shown no inclination to do away with the equipment on hand. The technological advancements in electric furnace operation are definitely on the side of the larger furnaces, where controls, charging and melting techniques, furnace handling, and many other developments have seemed to point the way to lower costs. However, lowered costs from such developments cannot be evidenced in lower prices until the steel industry has obtained such equipment that it can produce steel at these lower costs. The furnaces on hand in many plants now are still old, small, and somewhat obsolete.

Currently, the electric furnace construction business is looking somewhat brighter, according to observers in the field. The end of the second hand furnace business on furnaces built during the war is fast approaching, which should mean better market conditions in both domestic and foreign fields. There are a fair amount of orders now on builders' books, and quite a few furnaces completed and awaiting electrical equipment. The bulk of the backlog of electric furnace orders are for smaller type furnaces for foundries.

The newer plants, such as the electric furnace plant operated during the war by Republic Steel Corp. in Chicago, may be able to force a price decrease. Until things settle down a bit and a more normal competitive steel market exists, however, this is not likely. The advantages and economies of these warbuilt plants have not yet been completely proved under competitive peacetime conditions, and until this occurs no change in the pricing structure on alloy steels is likely. As to stainless, the price structure is fairly well set and any major change is unlikely. Of course, if steel prices in general come down, stainless and alloy will come down proportionately, but adjustments of either to reflect declines in operating costs is not likely at present.

WAA to Dispose Of Wartime Rail Trackage

Washington

• • • **WAA is preparing** to dispose of its war installed rail trackage. Until an inventory is completed it will not know the quantity it has but it is known to run into heavy tonnage. Since rails are a scarce item and are being sold to the carriers on an allotment basis, WAA anticipates quick disposal of its tonnage.

Meanwhile, it will advertise within a month three specific properties. One for which WAA's New Orleans office will ask bids is the 44 mile Claiborne & Polk railroad, near Monroe, La., which consists of 6000 tons of heavy rails. This is the old experimental carrier that was used by the army to train soldiers for overseas service. Another is the 23 mile Rialto backup, Fontana, Calif., which has about 3000 tons of rails. Bids for this project will be asked for by WAA's Los Angeles office. Another project, representing several thousand tons of rails, consisting of 20 airport installations, will be sold by WAA's Jacksonville, Fla., office.

Also a 50-mile railroad with about 7000 tons of rails is included in a project for which WAA will open bids on May 26 at Jacksonville. It runs from Carrabelle to Tallahassee and is part of the Camp Gordon Johnston development at Carrabelle, which aside from the carrier consists of a modern village of 56 apartment buildings and a cold storage plant. Bidders can buy one or more separate established units.

Employment Trends Up In Pittsburgh District

Pittsburgh

• • • **Employment reports** indicate a steady increase in the number of workers in the western Pennsylvania area, according to the Pennsylvania State Employment Service at Pittsburgh. March employment exceeded January employment in 807 area firms by 0.4 pct, with employment rolls totaling 312,000. Future treatments in 197 major area firms indicate a slight decrease during the next several months, but this will be more than counterbalanced by gains in construction, agriculture and seasonal employment. Additional employment increases are anticipated in food, primary and fabricated metalworking, mining, construction, and interstate railroad industry groups.

March employment of 249,549 was reported by the following industries in the area: Food and kindred products, primary metal producers, metal fabricators, and machinery builders. Companies reporting totaled 345.

The PSES reports that the supply of available workers in the area is adequate to meet all labor requirements of local firms. A total of 39,000 male and female workers are listed in the live applications for work with the Service. Of these, 20,000 are veterans, representing 69 pct of the unemployed male applications on file. The veteran group is composed chiefly of men in the 18 to 35 workable age group, and represents a labor supply which employers can use to obtain qualified workers for any type of job and

Reports Development Of Standard Test Methods In Field Of Adhesives

Philadelphia

• • • **There was progress** last week in the development of standardized test methods for adhesives and the preparation of recognized buying specifications when committee D-14 on adhesives of the American Society of Testing Materials met here for a semiannual full committee meeting.

The committee, only 3 years old, has already done much to adjust the problems of producers and consumers in the rapidly growing adhesives field to a common basis. In this connection the ASTM administrative committee on standards has recently announced the acceptance of four new test standards on adhesives. Two cover the determination of the applied weight per unit of area of liquid adhesives (D-899), and dried adhesive solids (D-898). The others include a test for strength properties of adhesives in shear (D-905), and a test for strength properties in plywood type construction using tension loading (D-906).

Possibly the most important development at the meeting, held under the chairmanship of R. C. Platow, Bell Telephone Laboratories, was the consideration of the format for proposed standard specifications for adhesives suitable for adhering wood to wood. When one of the three proposed formats is adopted after a letter ballot, values must be worked out for the standard. Then it will be possible to work out specifications according to this format for adhesives for other materials, including metals and plastics.

The specification will take into consideration such basic requirements as shelf life, viscosity, initial strength, permanency of bond, strength development, odor and fatigue. Secondary requirements which will probably be identified by a suffix letter in the specification may include working life, spread, flammability, stiffness and toxicity.

Adhesives now under consideration include animal, vegetable, urea formaldehyde, resorcinol formaldehyde, casein, soybean, liquid glue, casein-soybean, and polyvinyl formaldehyde.

Preliminary test results were disclosed on round robin shear tests involving 320 metal-to-metal joints and 320 plastic-to-plastic joints. Metals included Alclad 24ST and steel, SAE 1010. These test results, showing shear strength values and the types of failure observed, were developed under the chairmanship of Dr. R. F. Blomquist, U. S. Forest Products Laboratory.

Research projects currently under way on a round robin basis include tests on fatigue, preparation of test specimens, effect of cyclic humidity and temperature on permanence, integration of cleavage with tensile strength, flexibility, rate of strength development, speed of testing, concept of tack and blocking, nature of adhesive bond, physical strength determined by geometry of joint, technique of statistical analysis, determination of elastic constants, creep and relaxation of adhesive bond, effect of artificial light, fungus, etc., on adhesives, electrical properties, and a nondestructive test of adhesive bonds. The research program is being conducted by Dr. A. G. H. Dietz, Massachusetts Institute of Technology.

FPC Head Says Steel Pipe Scarcity May Cause Gas Shortage

Washington

• • • **A severe and continuing** shortage of materials for constructing additional pipe-line facilities, particularly steel pipe, combined with sharply increasing demands for natural gas will result in a scarcity of natural gas in the great gas-consuming areas of the Midwest and Appalachian regions next winter, according to Federal Power Commission Chairman Nelson Lee Smith.

Testifying recently before the Senate Interstate and Foreign Commerce Committee, Mr. Smith also attributed part of the shortage to the moratorium on pipe-line construction during the war years.

He told the committee that only two steel pipe mills in the United States roll the 26-in. diameter which is now generally preferred for long distance gas pipe lines, and only four are now producing 16-in. pipe and larger. Continuing, Mr. Smith stated that the maximum annual production capacity of these mills is about 1,150,000 tons, but at present output is considerably lower because of a lack of steel billets and plates, and probably amounts to between 700,000 and 800,000 tons a year.

Editor's Note: At least two large fabricating companies have facilities for making large diameter line pipe from steel plate.

Against this reported capacity and production, the requirements for natural-gas pipelines for which certificates were authorized or requested between Jan. 1, 1946 and March 15, 1947, amounted to nearly 2,590,000 tons for the larger sizes alone, Mr. Smith claimed.

Army Student Officers Visit Industrial Plants

Washington

• • • **In order to** foster closer relationship with industry as well as to give the Army's Industrial College students a practical outlook, seven groups of at least 15 student officers each are visiting industrial establishments during early May.

Plants and facilities of the steel, automotive, petroleum, electronics, shipbuilding, transportation and other industries in the seven industrial regions adjacent to Pittsburgh, Chicago, Detroit, Philadelphia, Baltimore, and New York will be visited although not necessarily by the same groups, according to Brig. Gen. E. B. McKinley, college commandant.

The Army Industrial College is a staff school for training both Army and Navy high ranking officers in duties relating to economic mobilization activities in emergencies or war. Study courses center on such problems as computing military supply requirements, purchase policies, production, transportation, storage and other phases of mobilization and supply involving industry.

Weekly Gallup Polls . . .

Public Expects Prices to Drop Within 6 Months

Princeton, N. J.

• • • **The weight** of opinion among the American voting public today is that prices are scheduled to go down within the next 6 months, according to George Gallup, director, American Institute of Public Opinion.

Forty-six percent, a poll of the nation finds, think prices will be lower 6 months from now than they are today. Twenty-two percent expect prices to go up during the same period. Twenty-four percent say they think prices will remain about the same as now. Eight percent have no opinion.

It is also interesting to note that the better informed among those polled show a greater inclination to expect a price drop than others. Men are more inclined to look for a price drop than women. Proportionately more Republicans than Democrats expect prices to drop off.

Eight months ago, nine out of ten among the voting public revealed a keen sense of what was to come along the price front. They said prices were due to rise.

Whether the weight of opinion is an accurate forecast in this case, only the future can show.

Expectancy of a price drop does, however, produce a psychology of caution on purchases. If people think prices are going down, they are more inclined than they otherwise might be to postpone a purchase, or at least to buy very carefully.

The present survey was conducted just prior to President Truman's speech before the nation's newspaper publishers in New York City. He said a recession threatens ahead unless prices come down.

The question in the recent poll:

"Do you think that prices, in general, will be higher, lower, or about the same 6 months from now?"

	Pct
Higher	22
Lower	46
About same	24
No opinion	8

The vote among various groups in the population:

	Higher Pct	Lower Pct	Same Pct	No Opin. Pct
Men	20	51	22	7
Women	24	42	25	9
Democrats	24	43	24	9
Republicans	18	53	24	5
College	13	57	26	4
Hill School	20	48	25	7
Grammar School or Less	25	43	22	10

Reasons given by those who think prices are going to continue upward:

(1) More strikes will cause prices to go higher.

(2) Manufacturers, enjoying high profits, will oppose any drop.

(3) The tremendous demand will send prices even higher than now.

Reasons given by those who think prices will be lower than at present in 6 months:

(1) People will simply stop buying; they can't pay present prices.

(2) Production will ease shortages and bring prices down.

In a poll taken last August, the institute asked:

"Do you think prices will go up in the next 6 months?"

Replies at that time:

	Pct
Yes	92
No	5
No opinion	3

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• • • **Fear** of war is rising throughout the United States.

More than seven in every ten voters polled by the institute say they think another war is likely within 25 years. Five out of every ten think it may come within 10 years.

This nervous attitude about present world conditions, with no peace settlement among the major powers, underlies many other basic American attitudes on current issues. It explains, for example, the large public vote which polls have found in favor of peacetime military training. It explains

Americans Dissatisfied With Progress of United Nations Fear of Another War Is Rising;

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the country's cautious attitude toward reducing the Army-Navy budget. It is closely related to the public's dissatisfaction with the progress of the United Nations organization to date, as reported last week.

The fear of war is shown in the following poll results, including a trend over the past 2 years.

"Do you think the United States will find itself in another war within, say, the next 25 years?"

	Yes Pct	No Pct	No Opin. Pct
Mar. '45	38	45	17
Mar. '46	69	19	12
Aug. '46	65	16	19
Today	73	18	9

The latest poll also asked a separate but comparable cross-section: "Do you think the United States will find itself in another war within, say, the next 10 years?"

The vote was yes 50 pct, no 38 pct, no opinion 12 pct.

If such widespread fear of war exists then why, some observers ask, do the people want to follow a tough policy with Russia? Won't the current fears sooner or later make the American people want to soften their tone toward the Soviet?

The chief reason for the current attitude toward Russia appears to be that the American people remember with distaste the bad experience they had with appeasement in the 1930s.

Appeasement of Hitler, Mussolini and Hirohito did not prevent war. The feeling is very widespread today that an opposite policy is no more likely to lead to

(CONTINUED ON PAGE 165)

Steel Trade Sees Ray of Hope for Better Deliveries

Some Easing Found in Plates But Customers Are Still Clamoring for Steel

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By D. I. BROWN
Chicago Regional Editor

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Chicago

• • • **For the first time** since late 1945 the trade is optimistic of better steel deliveries in some products. Producers are conservative but admit that things are looking up on all items except sheets and small bars. The enormous backlogs have been substantially reduced and in most cases the mills are current on the quota allotments with no carryover for third quarter.

Most noticeable easing is in plates. To be sure all plate fabricators are still crying for more material. Quota allotments are in most cases being fully taken by consumers but "bonus tonnages" have suddenly appeared on certain mills for June rolling. The surplus tonnage is small and has been quickly gobbled up but the mere fact that open space appeared on a mill schedule over and above quotas allocated, is a novel experience to the harried producers.

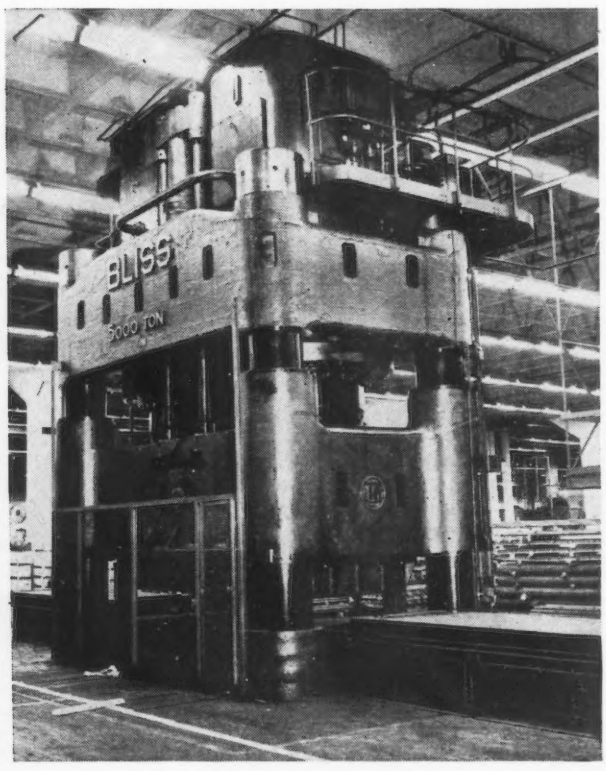
Two reasons have been cited as responsible for this late development. Production planning departments usually require 60-day lead time to schedule the rolling units. June schedules had to be made out Apr. 1. Customers on their quarter quotas were asked to order against their allocated tonnage by that date. On Apr. 1, one mill found that the full extent of such tonnages had not been received on plates for a 160-in. plate mill and on shapes on a 22-in. mill.

They extended the grace period for June scheduling to Apr. 15, with the advice that if customers did not take out their full quota by that time the balance would be canceled entirely, and not be passed along and added to July quotas. More orders came in at the last minute which when tabulated suddenly left this mill on Apr. 28, with open space in plates and some shapes for June rolling. This permitted acceptance of orders over and above allocated tonnage and was quickly assigned to others in the plate-hungry trade. Oddly enough some consumers who were first offered the excess tonnage graciously declined.

Sales executives of this mill attribute such "bonus tonnage" primarily to another factor. Their production in March and April was well ahead of planned tonnages and although a positive breakdown is not available they state that higher than expected production was the chief reason for the spot openings that appeared. Either way plate deliveries are improving and fabricators are beginning to finger their large backlog of orders hoping to be able to start on projects that had to be shelved because of lack of steel.

One of the largest plate fabricators in Chicago, reported they have enough facilities to double their production if they could just get plates. Orders in their hands would permit such operation for 6 months. Up until now they state they have had to be selective and have been forced to turn down large projects requiring heavy plate tonnage. This plant has gone as far as Harrisburg, Pa., and paid premium prices plus freight in order to maintain their present schedules. The experience of this plant proved typical in the ten other fabricators contacted, regardless of whether they depended on warehouse or mill shipments.

For the most part plate fabricators reported that customers have canceled very few orders. One shop reported the lull in new orders which occurred in February, has gone. March and April inquiries were heavy and orders are firm with buyers yelling for delivery. A fabricator making water tanks and diesel engine



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PRESSING PROBLEM: *WAA recently sold this* 5000-*ton Bliss press, largest piece of equipment in the former Fisher bomber plant. To ship it to its new owner, United Aircraft Corp., Bridgeport, Conn., engineers planned to take out part of the plant ceiling and move it in* 11 *freight cars. Original cost was* $168,356; *WAA got* $90,240 *for it.*

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frame supports was forced to rely on the diesel engine builder to get some of the plates needed for his fabrication.

Strong demands for agricultural equipment made from plates continue. One manufacturer making farm wagons has been scouring the countryside for universal mill plates. This maker can't get on the mills' books and has chased all gray market offers to the ground with little luck. All fabricators contacted said they have not laid off help. They are afraid to, as the men won't be available later. Their production per man-hour has therefore been low, cost high and volume erratic, but they have no alternative but to string along hoping for the best. For that reason even the small apparent break on the sullen plate horizon has been most encouraging to these steel consumers.

Mills report that other products than plates and shapes differ in supply. All are in accord that sheets, although current with quota allotments, haven't shown any "bonus tonnage" trend. Small bars are in the same boat. Only one producer reported a different position. On its 10-in. bar mill this plant still has a month's carryover from second quarter. Even on big rounds on this plant's 14 and 18-in. mills the same is true.

This is an extreme exception as carbon rounds, 2 in. and over, have lately eased with some producers offering 30 to 60 days delivery. Plates on this same mill show a little carryover also. However, the third and fourth quarters' quotas for this plant were just recently mailed and it may be found that consumers will not order out the full tonnages which would bring this producer in line with the latest position of the others.

The large Chicago mill which for months has been converting slabs, blooms, billet and ingots into finished sheets, bars and plates to the tune of 20,000 net ton a month, reports no slackening in this business. They are filled through July on such orders. This business is strictly in-a-pinch type, with consumers securing semi-finished and shipping from all over the place into Chicago, for conversion. Any general easing in steel deliveries will immediately dry this up, steel officials say, and should be the first good indication of substantial improvement on steel supplies.

All the fabricators reached in this Chicago survey report that their third and fourth quarter quotas were not cut. Pipe-line makers are still short of steel, operating on reduced schedules and receiving plates from the West. The extra freight is to the account of the ultimate user of such equipment and special freight rates apply on such shipments. The best example of the desperate plate buyer is a railroad car builder in Milton, Pa., who has ordered plates all the way from Geneva. Using a combination rate of the special charge from Geneva, to Chicago, plus the standard class freight rate on to Milton, would cost about $36 a gross ton just to get the steel to the building site. Who gets nicked for the additional cost could not be established but observers say that the railroad earmarked funds for new cars can't go very far if the practice is widely adopted.

None of the plate fabricators contacted complained about recent price increases. Some commented on freight charges applying from the mills instead of the closest basing point, but on the whole they wanted plates, "to hell with the price." Those who did remark on prices expressed the hope that the mills have finally decided on price, as the January and February price changes caused some consumers to doubt if anyone knew what the right price was at that time.

Army Program Under Way

Detroit

• • • **The U. S. Army's** Training-In-Industry Program has been started at the River Rouge plant of the Ford Motor Co. Under the direction of Archie A. Pearson, director of Ford's training department, Lt. Col. H. H. Daubert, U. S. Army Ordnance will spend a year studying the various departments of the Rouge plant. He will climax his year's study by taking actual work assignments within the Ford organization.

The purpose of the Army training program is to acquaint officers with the general problems of industry, improve and strengthen the relationship between Army and industry, and to familiarize industry with the needs of military procurement.

Col. William E. Buck, Jr., Army personnel and administration officer is also participating in the War Dept. training program at the Rouge. He will spend two months studying personnel and industrial relations procedures of the Ford Motor Co.

PARACHUTE RECOVERY
from 500,000 feet
500,000 FEET
TRAJECTORY APEX AND EJECTION POINT. SMALL RIBBON CHUTE OPEN
PATH OF CONTAINER
175
MAX. VELOCITY ALMOST 2700 MPH
100
MAIN CHUTE OPEN
60
VELOCITY 24 FPS.
SMALL CHUTE TO SLOW FALL
JETTISONABLE BULKHEAD
LG. MAIN CHUTE (RIBBON)
TENSIOMETER TO RECORD CHUTE OPENING SHOCK
TIMER FOR RELEASING BULKHEAD
PRESSURIZED COMPARTMENT FOR RADAR AND RECORDING INSTRUMENTS
MESH IN 18 BANDS OF LARGE CHUTE
REFLECTING MESH FOR RADAR TRACKING
INSTRUMENTS IN ROCKETS PLUMBING THE UNCHARTED UPPER ATMOSPHERE SOMETIMES TRANSMIT DATA BY RADIO, BUT THE METHOD IS NOT ALWAYS ACCURATE AND COSTLY INSTRUMENTS ARE ALWAYS DESTROYED ON IMPACT
A CONTAINER EQUIPPED WITH INSTRUMENTS AND SPECIAL PARACHUTES WAS THEREFORE INSTALLED IN A V-2 AND FIRED FROM A TUNNEL IN THE WARHEAD AT THE APEX OF THE ROCKET'S TRAJECTORY.

Details Steel Section Of Trade Pact Between U.K. and Belgium-Lux

Paris

• • • **Details have now** become available of the steel sections of the recent trade agreement between Belgium and Luxemburg on the one hand, and the United Kingdom on the other (THE IRON AGE, Mar. 6, p. 104). The deliveries, which are to total 20,000 metric tons of rolled products during the 3 months of the second quarter, will include what must certainly be a disappointingly small tonnage of billets for the British industry. Reports have indicated that British negotiators asked for up to 75 pct of the tonnage to be in semis, while the final agreement, at least as far as the first three months are concerned, will provide only 20 pct semis.

Of the billets, 3000 tons will be furnished by Belgium and 2000 tons by Luxemburg, at a price of about $80 per ton. This compares with a British domestic price of about $51, and a British export price of about $57 to $60. The import price problem is one of more concern to the British Government than it is to the British steel industry, as the industry will buy the billets at $51, with the government making up the difference.

Other products to be delivered during the initial 3-month period of the agreement include 1200 tons of hoops from Belgium and 2000 tons from Luxemburg at $101.20 per ton; 2400 tons of bars from Belgium and 900 tons from Luxemburg at $95.40 per ton; 900 tons of heavy and medium plates from Belgium and 600 tons from Luxemburg at $101.20 per ton; 500 tons of dynamo sheets from the Belgian steel industry and 150 tons from Belgian rerollers at $296.80 to $379.50 per ton; 2000 tons of netting wire from Belgium at $165.00 per ton; 1350 tons of casement sections from Belgian rerollers at $136 to $156 per ton; 1500 tons of gray beams from Luxemburg at $102.40 per ton; 1100 tons of joists and channels from Belgium and 400 tons from Luxemburg at $94.40 per ton.

The whole question of British steel prices, both domestic and export, is the subject of considerable discussion in the European press. No action has yet been taken by the government Iron and Steel Board on a general increase as foreshadowed in THE IRON AGE some weeks ago.

Due to the extreme urgency of the consideration of the modernization proposals for the British industry, the board has deferred action on the price question. This delay has also been necessary as it is understood the steel board intends to eliminate all of the indirect subsidies on ore, imports, and scrap in favor of a single system with the old central fund of war days re-established. The price problem is likely to be taken up after the board has disposed of the Corby expansion proposals of Stewarts and Lloyds and the Colville's proposals in Scotland.

Wilcox-Rich Split Into Three Michigan Divisions

Detroit

• • • **Eaton Mfg. Co.** of Cleveland has announced formation of three new Michigan divisions replacing the former Wilcox-Rich Div. New managers have been appointed for each of the new divisions. H. I. Dyer, formerly plant manager of the Battle Creek and Lawton plants, has been named general manager in charge of the Valve Div. in Battle Creek. Herbert Russell, formerly plant manager of the Saginaw plant has been named general manager of the Saginaw Div. which produces hydraulic valve lifters, tappets, valve seat inserts, and dynamic fan drives.

F. H. Mott, Jr., formerly in charge of sales and engineering for the Rotor Pump Dept. of Wilcox-Rich Div., has been named general manager of the Pump Div. at Marshall, Mich. which produces Eaton rotor pumps for various automotive truck, tractor and aircraft applications. Mr. Mott will maintain offices in Detroit where sales, engineering and research departments for all three divisions will be located.

D. Alexander will continue as resident manager of the Marshall plant.

R. H. Daisley, formerly general manager of the Wilcox-Rich Div. and vice-president of Eaton Mfg. Co. since 1938, has been made director of manufacturing for the company.

Coming Events

May 12-15 American Steel Warehouse Assn., annual meeting, Los Angeles.
May 15-17 Society for Experimental Stress Analysis, annual meeting, Chicago.
May 20-21 International Acetylene Assn., annual convention, Cincinnati.
May 21-22 American Iron & Steel Institute, annual meeting, New York.
May 26-27 Assn. of Iron & Steel Engineers, annual spring conference, Philadelphia.
May 27 Metal Powder Assn., spring meeting, New York.
June 2-4 American Gear Manufacturers, Hot Springs, Va.
June 5-7 Electric Metal Makers Guild, Inc., annual meeting, Pittsburgh.
June 9-11 American Coke & Chemical Institute, annual meeting, French Lick, Ind.
June 15-19 American Society of Mechanical Engineers, semiannual meeting, Chicago.
June 16-20 American Society for Testing Materials, annual meeting, Atlantic City, N. J.
June 17-19 Machinery Dealers National Assn., convention, Cincinnati.
June 23-27 American Electroplaters Society, industrial finishing show, Detroit.
July 14-18 American Society of Civil Engineers, Duluth, Minn.
Aug. 25-29 National Assn. of Power Engineers, Inc., Boston.
Sept. 8-12 Instrument Society of America, conference, Chicago.
Sept. 10-12 Porcelain Enamel Institute, Inc., Columbus, Ohio.
Sept. 17-26 National Machine Tool Builders' Assn., machine tool show, Chicago.
Sept. 29-Oct. 3 American Gas Assn., San Francisco.

The London ECONOMIST

Emergent Policy

Reprinted by special permission to further understanding on how political and economic affairs are viewed in London.

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PUBLIC concentration on the combative aspects of what Mr. Baruch calls the "cold war" now in progress should not obscure the fact that behind the Marshall "tough line" is a new phenomenon. Contrary to American habit, a foreign policy seems to be emerging which has both shape and direction.

The action which implements the policy may seem at times both overbrusque and overeager, but those are novice's faults. At least it has got past the stage of timid fumbling. When Truman asked for the repeal of that vestigial skin of isolationism, the Neutrality Act of 1939, he sought not only to get rid of detritus, but also to recommend new legislation more in keeping with present circumstances. When Vandenberg pinned verbal orchids on the fifty-seventh birthday of the Pan-American Union he talked to the whole hemisphere, and not merely to that portion of it lying below the forty-ninth parallel.

The inverse effect of Wallace's criticisms on the Greek-Turkish aid bill, the State Dept. announcement that negotiations of the American-Soviet Joint Commission in Korea had broken down and that the United States would therefore act independently, the current trade activity in Geneva, the attempts to find a basis for dealing with Mr. Peron which shall satisfy Argentina and mollify those American critics who remember his history—all these point, as do Marshall's daily disagreements in Moscow, to a congruent line of action whereever American interests are deemed to lie.

That policy is driven by three motors—impatience with the lack of progress in peace negotiations among former allies (and in particular with what looks to some people like intentional non-progress), distrust of the effects of exported communism, determination to strengthen the United States against real or fancied aggression by putting into effect a modern version of that recipe for victory ascribed to a general in the war between the States—"to get there fustest with mostest men."

That in some instances it is literally men while in others it is money, machinery, the loan of industrial and scientific "know-how" is in accord with modern strategic practice. The attitude of the military mind toward long-term planning is very different from anything which comes to the mind of an economist or a politician when he hears that word.

Its influence on American foreign affairs in the present administration is far from being a figment of the imagination, and cannot be usefully discounted by any reliance on the previous American habit of preferring to go diplomatically in flannels.

DURING a single week the policy has led the United States into plans of action north, south, west and east, as well as at home. Truman's request for the repeal of the Neutrality Act of 1939 was made on the ground that the ammunition control sections of that law were "particularly ineffective in dealing with current problems." He did not state which problems he had in mind. In asking for a new and different control law to take its place he said—and no surer measure of the difference between 1939 and 1947 exists—"We have committed ourselves to international cooperation through the United Nations. If this participation is to be fully effective, this government must have control over traffic in weapons which will permit us to act in accordance with our position in the United Nations and will be adaptable to international conditions."

It was not until the end of the next paragraph that he brought in "the security interests of the United States," and not until the end of the message that he paid his respects to the bogey which had done so much to inspire the original Act, the international arms brokers.

Vandenberg's gesture northward in inviting Canada to take her seat in the chair which has been waiting for her since the Pan-American Union building was erected in 1910 might be shrugged aside on the ground that his language was birthday oratory. Yet observers noted that only a month earlier the Canadian Deputy Minister for External Affairs, Mr. Pearson, had made a speech in New York City in which he supported Pan-Americanism within the framework of the United Nations.

At least one division in the State Dept. is said to be working on studies designed to relate the Pan-American Union closely to the United Nations, and there are those who believe that a formal invitation to join the Union may be extended to Canada at the coming Bogota Conference.

SOUTHWARD, the policy apparently calls for eating a rather tough crow. If ways can be found, without too great indigestion, for disposing of the policy towards Argentina which Mr. Braden initiated in 1945, and if at the same time Argentina can be persuaded to comply with the promises she made at Chapultepec and has been disregarding ever since, the Bogota Pan-American Conference may usher in a new and broader version of the hemisphere cooperation which Roosevelt made so important and which Truman has left to wither to such dangerous unimportance.

On the result of the Bogota Conference will depend the much-postponed Rio Conference on hemisphere defense. Whether negotiations will proceed to the point where military equipment and experts will be sent south no matter what the

(CONTINUED ON PAGE 163)

Industrial Briefs . . .

• BRANCH OFFICE — Detroit Ball Bearing Co. of Michigan, announces the opening of a branch in Flint located at 3612 North Saginaw St., under the direction of R. E. Manderfield.

• BUYS DIVISION—The operating management of Rheem Research Products Inc.—Iridite Div. have bought this division from Rheem Mfg. Co. As of May, it will operate as "Allied Research Products Inc." The exclusive right to manufacture and sell Iridite in this and foreign countries has likewise been arranged on a royalty basis with Rheem Mfg. Co.

• NEW ADDITION — Micromatic Hone Corp. is erecting a 35,000 sq ft addition to its present building at 8100 Schoolcraft, Detroit. The new facility will house all heavy machining and job honing operations.

• FIRM PRICES—The Yoder Co. has announced that effective Apr. 28, "escalator clauses" would be dropped from all Yoder Co. quotations on electric weld tube mills and metal forming mills. Quotations will be made at "firm" prices with the exception of electrical equipment, and as soon as electrical equipment manufacturers quote "firm" prices, Yoder Co. will drop that clause.

• ANNIVERSARY — Paterson-Leitch Co., one of Cleveland's oldest steel firms, celebrated a dual event recently, completion of a third of a century in the steel warehousing field and the finishing of a plant addition which will increase manufacturing space by 20 pct.

• LEASES FORGING PLANT — Pennsylvania Transformer Co. has leased another section of the $8 million surplus aluminum forging plant at Canonsburg, Pa., for a period of 5 years. This is the third portion of the plant to be leased by the firm.

• REBUILDING — Clearing of wreckage and plans for rebuilding Monsanto Chemical Co.'s styrene plant at Texas City, are already underway. Parts of the plant may be in production in 6 months and the rebuilding site will be cleared as quickly as possible. Meanwhile, Monsanto is attempting to find unused wartime styrene facilities which it may operate on a temporary basis. If no delay of materials occurs, William H. Rand, president, stated that the entire plant could be rebuilt within 18 months. Some sections may be back in production in six to eight months.

• OKAYS BUILDING—The Office of Housing Expediter has approved construction of a $260,000 furnace building at the Sheffield, Ala., plant of the Electro Metallurgical Co.

• SCHAIBLE BUYS—Schaible Co., manufacturers of valves and plumbing fittings, has leased the north shop of Wright Aeronautical Corp., Lockland, Ohio, and is expected to purchase it before June 1. It is considered to be one of the largest manufacturing units in the world.

• EXPANSION PROGRAM—McKay Machine Co. plans construction of a large plant addition which will be used for production of steel plant equipment. Approval for the plant addition, which will cost $104,654, has been given.

• CHAPTER HEAD—Meyer Ruchman, of the Indiana Rolling Mill Baling Corp., Ft. Wayne, Ind., has been elected president of the Indiana chapter of The Institute of Scrap Iron & Steel, Inc.

• NEW ADDITION PLANNED—The Watson-Standard Co. announces plans for addition to its manufacturing facilities in Pittsburgh with a new modern plant to be located at Neville Island.

First Quarter Earnings

(CONTINUED FROM PAGE 118)

$1,804,487 after all charges, or 40¢ per common share.

The company had an outlay of almost $5 million during the quarter on its long-range improvement program, and also put $1,500,000 into the sinking fund to retire long-term debt. "Despite these extraordinary heavy expenditures, the company's working capital decreased only $1 million approximately, from $82,577,790 to $81,564,060," Charles R. Hook, Armco president reported.

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Philadelphia

• • • **The Midvale Co.** reported that the balance for transfer to surplus for the 12 months ended Mar. 31, 1947, amounted to $1,007,738. Richard T. Nalle, president, said this was made up of a loss for the period amounting to $1,659,175 and a credit of $2,666,913 for estimated recovery under carryback provisions of the Revenue Act applicable to loss for the 9 months ended Dec. 31, 1946.

•

Pittsburgh

• • • **Pittsburgh Steel Co.** reported net income of $716,472 for the quarter ended Mar. 31, 1947 on sales of $18,348,789.

•

Conshohocken, Pa.

• • • **Alan Wood Steel Co.** earned a net profit of $491,593 for the first quarter of this year, contrasted with a $263,422 loss for the comparable strike-ridden period of 1946. Sales were $8,697,772 against $4,285,113 in the respective periods.

•

Cleveland

• • • **M. A. Hanna Co.** has reported net profit of $1,141,813 for the first quarter of 1947 after all charges, including depreciation and depletion and estimated provision for federal taxes. The profit is equal after preferred dividend requirements to $1.01 a share on the 1,030,464 outstanding common shares. In the first quarter of 1946 the company's net profit was $1,020,471, equivalent to 89¢ a common share after preferred dividend requirements.

Construction Steel . . .

• • • **Fabricated steel awards** this week included the following:

2100 **Tons,** Milwaukee, 14 30-million gal propane tanks to Bethlehem Steel Co., Bethlehem, Pa.

1360 **Tons,** various locations, tanks for Pure Oil Co. previously reported has been abandoned.

880 **Tons,** Urbana, Ill., chemical building for University of Illinois to Bethlehem Steel Co., Bethlehem, Pa.

750 **Tons,** Hampton Bridge, N. H., New Hampshire Dept. of Highways, bridge superstructure, to Phoenix Bridge Co., Phoenixville, Pa.

500 **Tons,** Hudson, Mass., mill for Hudson Worsted Co. to Bethlehem Fabricators, Inc., Bethlehem, Pa.

450 **Tons,** Trenton, N. J., John A. Roebling's Sons Co., enameling shop, to Belmont Iron Works, Philadelphia.

400 **Tons,** Vandalia, Ill., Fayette County highway bridge section W2F to Illinois Steel Bridge Co., Jacksonville, Ill.

375 **Tons,** Milville, N. J., New Jersey Dept. of Highways, lift bridge, Brann & Stuart, Philadelphia, general contractors, low.

275 **Tons,** LaGrange, Ill., east warehouse extension, Electromotive Div., General Motors Corp., to J. T. Ryerson & Sons, Chicago.

250 **Tons,** Newport, Del., E. I. du Pont de Nemours Co., building, to Bethlehem Fabricators, Inc., Bethlehem, Pa.

235 **Tons,** Bellwood, Ill., housing project previously reported has been abandoned.

200 **Tons,** Madras, Ore., 96-in. pipe section, U. S. Bureau of Reclamation, to Pacific Coast Engineering Co., Alameda, Calif.

175 **Tons,** Grant County, Wis., bridge specification S0137-2 to Milwaukee Bridge Co., Milwaukee.

170 **Tons,** Bayfield County, Wis., state highway bridge W2R-1 to Milwaukee Bridge Co., Milwaukee.

140 **Tons,** Vallas County, Wis., state highway project T024-1 to Worden Allen Co., Milwaukee.

120 **Tons,** Cambria County, Pa., Pennsylvania Dept. of Highways, Route 221, section 9, A. E. O'Block, Unity, Pa., general contractor, to Phoenix Bridge Co., Phoenixville, Pa.

• • • **Fabricated steel inquiries** this week included the following:

2550 **Tons,** Minneapolis, 64 butane tanks for United Petroleum & Gas Co.

1600 **Tons,** State of Illinois, 40 propane tanks.

900 **Tons,** Chicago, 130th St. bridge construction.

510 **Tons,** Kern County, Calif., two steel girder bridges between Bakersfield and Snow Road, California Div. of Highways, Sacramento, bids to May 28.

470 **Tons,** Heber, Utah, Duchesne Tunnel, steel tunnel supports, Bureau of Reclamation, Denver, Spec. 1809, bids to June 16.

250 **Tons,** Kingman, Ariz., gantry crane, etc., Davis power plant, Bureau of Reclamation, Denver, Spec. 1718, bids under advisement.

250 **Tons,** Vienna, Md., Eastern Shore Public Service Co., powerhouse extension, due May 10.

200 **Tons,** Philadelphia, Pennsylvania Sugar Co., warehouse, due May 12.

200 **Tons,** Cambria County, Pa., Pennsylvania Dept. of Highways, bids previously rejected, due May 9.

160 **Tons,** Parkersburg, W. Va., American Viscose Corp., structural steel, bids in.

105 **Tons,** Philadelphia, Esslinger Brewery Co., addition to plant, bids in.

• • • **Reinforcing bar awards** this week included the following:

165 **Tons,** Newton, Mass., telephone exchange to Truscon Steel Co., Boston.

125 **Tons,** Taunton, Mass., telephone exchange to Truscon Steel Co., Boston.

100 **Tons,** Chicago, building, Goodman Mfg. Co., previously reported to Sumner Sollitt Co. to Bethlehem Steel Co., Bethlehem, Pa.

• • • **Reinforcing bar inquiries** this week included the following:

1685 **Tons,** Tracy, Calif., Delta Mendota Intake canal and Tracy pumping plant, Bureau of Reclamation, Denver, Spec. 1810, bids to June 2.

320 **Tons,** Fort Collins, Col., Horsetooth Dam, Bureau of Reclamation, Denver, Inv. E-46,435-A.

320 **Tons,** Kern Co., Calif., four reinforcing concrete bridges between Bakersfield and Snow Road, California Div. of Highways, Sacramento, bids to May 28.

300 **Tons,** Rockford, Ill., generating plant for Central Illinois Electric & Gas Co., Stone & Webster Engineering Corp., contractors.

200 **Tons,** Jackson, Calif., three bridges, California Div. of Highways, Sacramento, bids to May 28.

• • • **Pipe awards** this week included the following:

19,000 **Tons,** Hugoton, Kan., 24-in. and larger pipe for Stranolind Oil & Gas Co. to various concerns through Stone & Webster Engineering Corp., Boston.

American Steel & Wire Reported Planning New Fine Tire Wire Plant

Cleveland

• • • **Construction of a** $10 million plant for production of high strength steel wire 0.0059 in. in diameter is under consideration by American Steel & Wire Co., U. S. Steel Corp. subsidiary, according to reliable sources here.

Developed in the research department at American Works of American Steel & Wire Co., the 0.0059-in. wire was used extensively in heavy-duty tires during the war and proved to be of great value in providing longer life for casings while conserving critical rubber.

Various aspects of the proposed plant, including possible plant sites, are said to have been under examination by American Steel & Wire Co. officials for the past 8 months, and some market surveys have been made.

Concentration of the rubber industry in Akron, Ohio, would seem to make that city or its immediate vicinity a logical choice. However an American Steel & Wire Co. official, while admitting that the plant was a definite possibility, said that no site had been decided upon, and that the plant itself was still in the discussion stage. According to reports, one potential consumer has already attempted to place an order for 25 tons of this wire per day.

The wire lends itself to a number of other uses, such as reinforcement for V-belts, power transmission belts and conveyor belts, where strength and endurance must be combined with a high degree of flexibility.

Three fine wires are twisted into a strand, and six of these strands are laid around a central core to form a cord 1/32 in. in diameter. A number of cords are then placed parallel to each other and coated with rubber, producing a ply of extreme strength and resistance for use in tire construction.

When three or four of these plies are laid, with the wires in each running at an angle to the wires in the other plies, a strong, flexible foundation is afforded for application of the tread rubber. Due to the wrenching and bending to which the cords are subjected, the wire used in their production must be of an extremely high grade with tensile strengths ranging from 325,000 to 400,000 psi.

Okays Plant Construction

Washington

• • • **Permission to** build a $3 million automotive parts plant at Detroit by the Chrysler Motor Parts Corp. has been granted by the Office of the Housing Expediter. Approval was given on the basis that the project involved production of items deemed critical.

At the same time, construction of a $990,000 auto accessories factory by the Hazleton Industrial Development Corp. at Hazleton Pa., was authorized by the Housing Expediter. Also approved was a $42,000 expansion project by Service Screw Products, Dearborn, Mich., for manufacture of screw machines.

Detrola Reports Net Sales

Detroit

• • • **Consolidated net sales** of International Detrola Corp. for the 5 months ended Mar. 31 were $30,050,108 and net profit after tax provision was $1,204,324, equal to 99¢ per share, C. Russell Feldmann, president announced recently.

MACHINE TOOLS

. . . News and Market Activities

Preparations for Machine Tool Show Get Into Full Swing

• • • **Signs of the** strong underlying trend in capital goods which business analysts have been sampling for the past two months were evident in the machine tool industry last week as preparations for the Machine Tool Show were getting into full blast.

In Detroit, plans to produce automatic transmissions appear to be moving forward. During the past week one automobile manufacturer sent out requests for quotations on parts for such a transmission which is expected to go into production "very shortly."

There are also indications that one of the Big Three is definitely set on the engineering of an automatic transmission unit and a request for quotatinos is expected within the next two weeks.

One reason for hold-ups in retooling plans for the new model cars is said to be a shortage of clay modelers and pattern-makers. However, it is believed to be possible to make retooling releases as late as June and yet introduce the new models in late November or December. Thus May and June may see the placement of a considerable amount of new tooling and completion in time for late 1948 production.

While the Automotive Tool & Die Manufacturers Assn. reports that the bulk of the tooling jobs on 1948 models has already been placed or completed, it is believed that a considerable volume of new tooling as yet unreleased will make an appearance in the near future.

In Chicago, a meeting of machine tool show exhibitors was held last week and those present examined the show space in the Dodge-Chicago plant. It now appears that there is not a single square foot of space to spare and the National Machine Tool Builders Assn., sponsors of the show, continues to get requests for exhibit space.

Evidence of Strong Underlying Trend in Capital Goods Appears in Industry

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In Cincinnati, the machine tool market is very quiet and much the same as last week; builders are trying to keep their employees busy in what appears to be a lull in buying. Most companies heading up in Cincinnati are designing and building new machines for the show, and at the recent meeting of machine tool builders at Atlantic City, attended by Cincinnati executives, the general feeling was that some buying at least would be delayed until consumers had viewed the many new developments that will be unveiled at the show and then requisition their needs accordingly.

Some Cincinnati sources feel that although the summer season is regularly a slow period for machine tool buying, this year it is expected to be doubly so, with a spurt expected in the fall. Foreign business, according to reports, is extremely spotty, with little demand for replacement or repair parts with the exception of Russia, who orders repair and replacement parts at the same time new machinery is ordered.

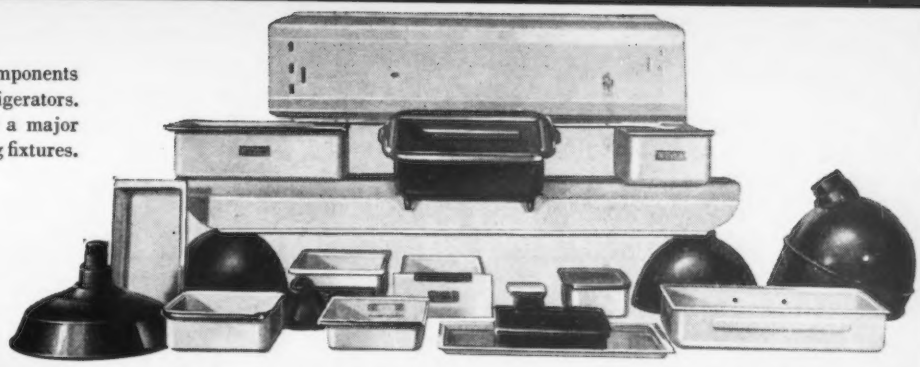
War Assets Administration announced in Washington that the War Dept. is releasing all Army claims on machine tools stored in the Wright Aeronautical plant in Lockland, Ohio. Part of this plant was leased recently to the Schaible Co., Cincinnati, and occupation is being delayed because of the Army tools stored there. WAA officials have indicated that all tools in question might now be sold, although a recent sale of tools at the plant was called off, because certain of them had been earmarked for the JANMAT program.

In Cleveland, National Acme Co. has reported net profit of $605,434 for first quarter, 1947, equal to $1.21 a common share after a federal income tax provision of $376,000. This compares with net of $633,798, or $1.27 a share in the first three months of 1946 when $394,000 was provided for taxes. Directors declared a dividend of 50¢ a share, payable May 22 to holders of record May 8. Similar amount was paid Feb. 25.

WAA recently announced in Cleveland that it has had limited success in selling the special purpose machine tools which were designed and used exclusively to produce war material but which have no immediately apparent peacetime use. These "white elephants" have been offered at fixed prices and have found few takers. WAA will now channel them back into industry as salvage on a "name-your-own-price" bid basis. In the same manner, WAA will depart from its fixed price policy to dispose of over-age tools, built in 1921 or any previous year.

The new program is expected to be a boon to many small machine shop operators who ordinarily cannot afford the heavy initial outlay for production equipment.

In Boston and the East, some machine tool builders are not putting forth any strenuous effort to increase export business, primarily because domestic sales are much less of a headache. In some segments of the industry, export business has averaged about 2 to 3 pct of total volume. To some producers, on the other hand, export sales have been a lifeline. First quarter results in many cases show that of total volume, 12 to 40 pct was foreign, with those shipping the most equipment abroad declaring that the export market has not been scratched.



Strong produces 85% of the enameled components used by 5 major manufacturers of refrigerators. Also shown are enameled reflectors for a major line of home, industrial and arena lighting fixtures.

HERE'S DEEP-DRAWN VARIETY

Why Bliss Engineers Recommend *Both* Mechanical and Hydraulic Presses For Wide-range Drawing

Scrap loss, down time, set-up time—these are the plus or minus signs of production arithmetic.

Even if your products are special and few, selection of *complete* drawing equipment is an important factor in keeping costs down, production at peak-levels. And for the jobbing shop, producing a wide variety of short-run items, flexible drawing facilities are an absolute "must" to maintain the profit-margin on *all* competitive bids.

The Strong Manufacturing Company of Sebring, Ohio,—one of the nation's leading sub-contractors for enameled deep-drawings—has overcome the problems of product-variety and short-runs by equipping its shop with *both* Mechanical and Hydraulic drawing presses. These captioned photographs show how Strong attains the greatest possible utility by using both types of Bliss presses.

For routine deep-drawing in light and medium gauges, Strong prefers Bliss double-action toggle presses because of their accessibility and speed. Toggle presses are particularly effective for rapid drawing of small-diameter shells in one or more operations.

Strong prefers Bliss Hydro-Dynamic presses for safe and effortless deep-drawing of large-area items from stock of non-uniform thickness and temper. Here, at left, is a refrigerator vegetable pan, being deep-drawn in one operation on a 75-35 ton Bliss hydraulic press. The first try-out stroke of this new press produced a perfect piece, and the initial run of 10,000 pieces resulted in only 4 rejects! At right, a 250-125 ton hydraulic produces insets for large electric roasters, using only 40 tons blankholding pressure for a wrinkle-free draw.

Variety again pays off in such unusual second operations as the swedging of work-hardened material, illustrated above. The grooves are deep, with small bottom radii. A double-action Bliss hydraulic press provides the uniform speed and constant blankholding pressure that mean few rejects, long life for expensive dies. Interchangeable tools permit emergency scheduling of rush jobs to the more available Mechanical *or* Hydraulic machine.

Here, then, is a perfect example of partnership between press and user, in which the inherent skill and versatility of each contribute to superior performance. You can enjoy similar efficiency by calling on Bliss' 90 years of experience in press engineering, and on those unbiased recommendations which only the manufacturer of Mechanical *and* Hydraulic presses can make.

E. W. BLISS COMPANY, DETROIT 2, MICHIGAN

Mechanical and Hydraulic Presses, Rolling Mills, Can and Container Machinery

WORKS AT: Brooklyn, N. Y.; Toledo, Cleveland, Salem, Ohio; Hastings, Mich.; Derby, England; St. Ouen sur Seine, France • SALES OFFICES: Detroit; Brooklyn; Cleveland, Dayton, Toledo, Ohio; Lansing, Mich.; Chicago; Philadelphia, Pittsburgh, Pa.; Rochester; New Haven; Boston; Toronto.

BLISS BUILDS MORE TYPES AND SIZES OF PRESSES THAN ANY OTHER COMPANY

STAY AHEAD WITH *Bliss*

NONFERROUS METALS

. . . News and Market Activities

General Import Order M-63 Revoked May 1

Washington

• • • **General Imports** Order M-63, which grew from an original listing of 13 materials to be imported only by the Office of Metals Reserve in 1941 to cover more than 500 commodities by 1943, has been revoked as of May 1 when control of the single remaining item, tin, was transferred to CPA's tin conservation order, M-43.

The amended Order M-43 provides specifically against unauthorized diversion to domestic use of "in transit" tin shipments originally consigned to foreign countries and changes inventory provisions.

This latter change substitutes maximum days' supplies for materials previously subject to "practicable working minimum" limits under the recently revoked PR-32.

•

Producers Won't Make Copper Sales to U.S.

Toronto

• • • **Canadian copper** producers can expect higher prices for copper during the last half of 1947, starting with 20¢ per lb in July and approximately 20.5¢ in August, James Y. Murdoch, president of Noranda Mines, stated at the annual meeting.

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Lead

• • • **From the standpoint** of the consumer the position of lead is very much better than it has been since the end of the war. Producers estimate that with greater mine production and secondary recovery stimulated by the current higher price, together with larger imports, supply and demand are in approximate balance. Consumers of lead are said to be holding back on orders as much as possible so as to avoid being caught with a high priced inventory in the event of a price decline in the metal. Prices continue at previous levels.

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Zinc

• • • **While most grades** of zinc including Special High Grade continue readily available, there is still a shortage of Prime Western to meet all demand. Consumers are eager to place orders for this grade to the extent of its availability to them. This is not true of any other grade including the previously scarce die casters specialty which is considered by producers to be in approximate balance. Prices remain unchanged.

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Copper

• • • **Early this week** no major producer of foreign copper had taken action which would equalize the domestic market price with foreign copper, now quoted at 23.75¢ f.a.s. New York. Consumers continue unable to obtain their full requirements and, according to statements of producers, no policy has yet been established as to importation from Chile.

The trade has been very much interested in the statement of President Steinkraus of the Bridgeport Brass Co. to the effect that cancellations of orders have had a significant effect on order backlogs. Other brass mills concede that the reckless buying trend for 6 months to a year in advance of needs is no longer present and that there has been some cancellation of orders to rectify unbalanced inventory positions. However, they report that this trend has been in effect for some months and is not one of major importance to the mills. Lack of sufficient copper has prevented the mills recently from operating at 3-shift capacity rates, not a lack of orders which are building up into a greater backlog for some products.

However, there are certain brass mill products that are obtainable for June delivery from major producers, and others may be able to deliver some of these products within several weeks. These products for early delivery include: Copper and brass rod, all sizes; medium and heavy gage brass strip; large copper tubing; heavy brass plate; medium and heavy brass sheet.

Some brass mills are currently negotiating wage agreements with locals of the Progressive Metalworkers' Council, now affiliated with the Union of Marine and Shipbuilding Workers' Union based on the steel wage agreements. NLRB elections have been scheduled at Waterbury, Ansonia and Bridgeport to determine the union bargaining agency at several mills.

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Monthly Average Prices

• • • **The average prices of the major nonferrous metals in April, based on quotations appearing in THE IRON AGE, were as follows:**

	Cents Per Pound
Electrolytic copper, Conn. Valley	21.50
Lake copper, Conn. Valley	21.625
Straits tin, New York	80.00
Zinc, East St. Louis	10.50
Zinc, New York	11.005
Lead, St. Louis	14.80
Lead, New York	15.00

Signs Tariff Suspension

Washington

• • • **The 4¢ a lb** import tax on copper is suspended until Mar. 31, 1949 under a bill signed by President Truman on Apr. 29. Under the terms of the new law, the tax is retained on copper sulfate.

Nonferrous Metals Prices

Cents per pound

	Apr. 30	May 1	May 2	May 3	May 5	May 6
Copper, electro, Conn.	21.50	21.50	21.50	21.50	21.50	21.50
Copper, Lake, Conn.	21.625	21.625	21.625	21.625	21.625	21.625
Tin, Straits, New York	80.00	80.00	80.00	....	80.00	80.00
Zinc, East St. Louis	10.50	10.50	10.50	10.50	10.50	10.50
Lead, St. Louis	14.80	14.80	14.80	14.80	14.80	14.80

Primary Metals

(Cents per lb, unless otherwise noted)

Aluminum, 99+%, f.o.b. shipping point (min. 10,000 lb) 15.00
Aluminum pig, f.o.b. shipping point 14.00
Antimony, American Laredo Tex... 33.00
Beryllium copper, 3.75-4.25% Be; dollars per lb contained Be.....$14.75
Beryllium aluminum, 5% Be; dollars per lb contained Be $27.50
Cadmium, del'd $1.75
Cobalt, 97-99% (per lb)....$1.50 to $1.57
Copper, electro, Conn. Valley..... 21.50
Copper, lake, Conn. Valley 21.625
Gold, U. S. Treas., dollars per oz.. $35.00
Indium, 99.8%, dollars per troy oz. $2.25
Iridium, dollars per troy oz.....$85 to $95
Lead, St. Louis 14.80
Lead, New York 15.00
Magnesium, 99.8+% 20.50
Magnesium, sticks, carlots 36.00
Mercury, dollars per 76-lb flask, f.o.b. New York.....$86.00 to $88.00
Nickel, electro, f.o.b. New York.... 37.67
Palladium, dollars per troy oz. $24.00
Platinum, dollars per troy oz..$59 to $62
Silver, New York, cents per oz..... 73.75
Tin, Straits, New York..... 80.00
Zinc, East St. Louis 10.50
Zinc, New York 11.005
Zirconium copper, 6 pct Zr, per lb contained Zr $8.75

Remelted Metals

Brass Ingot

(Cents per lb, in carloads)

85-5-5-5 ingot
No. 115 ..... 20.50
No. 120 ..... 20.00
No. 123 ..... 19.50
80-10-10 ingot
No. 305 ..... 24.50
No. 315 ..... 22.75
88-10-2 ingot
No. 210 ..... 28.25
No. 215 ..... 27.25
No. 245 ..... 22.75
Yellow ingot
No. 405 ..... 16.25
Manganese Bronze
No. 421 ..... 18.50

Aluminum Ingot

(Cents per lb, lots of 30,000 lb)

95-5 aluminum-silicon alloys:
0.30 copper, max. 17.00
0.60 copper, max. 16.25-16.75
Piston alloys (No. 122 type) 15.00-15.25
No. 12 alum. (No. 2 grade)..... 14.50
108 alloy 14.75
195 alloy 15.25-15.50
AXS-679 ..... 14.75
Steel deoxidizing aluminium, notch-bar, granulated or shot
Grade 1—95 pct-97½ pct 15.50
Grade 2—92 pct-95 pct 14.50
Grade 3—90 pct-92 pct 13.75
Grade 4—85 pct-90 pct 13.25

Electroplating Supplies

Anodes

(Cents per lb, f.o.b. shipping point in 500 lb lots)

Copper, frt. allowed
Cast, oval, 15 in. or longer..... 36⅞
Electrodeposited 31¼
Rolled, oval, straight, delivered.. 32⅛
Brass, 80-20, frt allowed
Cast, oval, 15 in. or longer 33
Zinc, Cast, 99.99 ..... 18¾
Nickel, 99 pct plus, frt allowed
Cast 51
Rolled, depolarized 52
Silver, 999 fine
Rolled, 1000 oz lots, per oz. 88¼

Chemicals

(Cents per lb, f.o.b. shipping point)

Copper cyanide, 100 lb drum 40.50
Copper sulphate, 99.5, crystals, bbls 11.50
Nickel salts, single, 425 lb bbls, frt allowed 14.50
Silver cyanide, 100 oz. lots, per oz 70⅞
Sodium cyanide, 96 pct, domestic, 200 lb drums 15.00
Zinc cyanide, 100 lb drums..... 34.00
Zinc, sulphate, 89 pct, crystals, bbls, frt allowed 7.75

Mill Products

Aluminum

(Cents per lb, base, subject to extras for quantity, gage, size, temper and finish)

Drawn tubing: 2 to 3 in. OD by 0.065 in. wall: 3S, 43.5¢; 52S-O, 67¢; 24S-T, 71¢; base, 30,000 lb.

Plate: ¼ in. and heavier; 2S, 3S, 21.2¢; 52S, 24.2¢ 61S, 23.8¢; 24S, 24S-AL, 24.2¢; 75S, 75S-AL, 30.5¢; base, 30,000 lb.

Flat Sheet: 0.136-in. thickness: 2S, 3S, 23.7¢; 52S, 27.2¢; 61S, 24.7¢; 24S-O, 24S-OAL, 26.7¢; 75S-O, 75S-OAL, 32.7¢; base, 30,000 lb.

Extruded Solid Shapes: factor determined by dividing the perimeter of the shape by its weight per foot. For factor 1 through 4, 3S, 26¢; 14S, 32.5¢; 24S, 35¢; 53S, 61S, 28¢; 63S, 27¢; 75S, 45.5¢; base, 30,000 lb.

Wire, Rod and Bar: screw machine stock, rounds, 17S-T, ¼ in., 29.5¢; ½ in., 37.5¢; 1 in., 26¢; 2 in., 24.5¢; hexagons, ¼ in., 35.5¢; ½ in., 30¢; 1 in., 2 in., 27¢; base, 5000 lb. *Rod:* 2S, 3S, 1¼ to 2½ in. diam, rolled, 23¢; cold-finished, 23.5¢ base, 30,000 lb. *Round Wire:* drawn, coiled, B & S gage 17-18; 2S, 3S, 33.5¢; 56S, 39.5¢; 10,000 lb base. B & S gage 00-1: 2S, 3S, 21¢; 56S, 30.5¢. B & S 15-16; 2S, 3S, 32.5¢; 56S, 38¢; base, 30,000 lb.

Magnesium

(Cents per lb. f.o.b. mill. Base quantity 30,000 lb.)

Sheet and Plate: Ma. FSa. ¼ in., 54¢-56¢; 0.188 in., 56¢-58¢; B & S gage 8, 58¢-60¢; 10, 59¢-61¢; 14, 69¢-74¢; 16, 79¢-81¢; 18, 87¢-89¢; 22, $1.25-$1.31; 24, $1.71-$1.75.

Round Rod, Square and Hexagonal Bar: M, diam, in. ¼ to ⅜, 55¢; ⅜ to ¾, 52.5¢; ¾ to 4 in. and over, 52¢. Other alloys higher.

Extruded Solid Shapes and Rectangles: M, form factors 1 to 4, 52¢; 8 to 10, 53.5¢; 14 to 16, 56.5¢; 20 to 22, 61¢; 26 to 28, 68¢. Other alloys higher.

Tubing: M, based on weight in pounds per lineal foot, 2 lb. and over, 55¢; 1 to 1.5, 58.5¢; 0.5 to 0.7, 64¢; 0.35 to 0.4, 69¢; 0.25 to 0.3, 73¢; 0.15 to 0.2, 81¢; 0.085 to 0.10, 96¢; 0.05 to 0.06, $1.14; 0.04 to 0.045, $1.28. Other alloys higher.

Nickel and Monel

(Cents per lb, f.o.b. mill)

	Nickel	Monel
Sheets, cold-rolled	54	43
No. 35 sheets	..	41
Strip, cold-rolled	60	44
Rod		
Hot-rolled	50	39
Cold-drawn	55	44
Angles, hot-rolled	50	39
Plates	52	41
Seamless tubes	83	71
Shot and blocks	..	31

Zinc

(Cents per lb, f.o.b. mill)

Sheet, l.c.l. 15.50
Ribbon, ton lots 14.50
Plates
Small 13.50
Large, over 12 in. 14.50

Copper, Brass, Bronze

(Cents per lb)

	Extruded Shapes	Rods	Sheets
Copper	32.78	....	32.93
Copper, hot rolled.	....	29.28	....
Copper, drawn	....	30.28	....
Low brass	39.13	30.32	30.63
High brass	32.30	29.58	29.89
Red brass	39.74	30.93	31.24
Naval brass	28.73	27.48	33.42
Brass, free cutting	27.23	23.64	....
Commercial bronze	40.86	32.05	32.36
Manganese bronze	32.28	30.78	36.92
Phosphor bronze, 5 pct.	....	50.98	50.75
Muntz metal	28.42	27.17	31.61
Everdur, Herculoy Olympic, etc	36.30	34.80	37.71
Nickel silver, 5 pct.	40.54	39.53	37.92
Architectural bronze	27.23	....	....

Scrap Metals

(Dealers' buying prices, f.o.b. New York in cents per pound.)

Brass Mill Scrap

(Lots of less than 15,000 lb.)

Cartridge brass turnings 14¼
Loose yellow brass trimmings..... 15⅛

Copper and Brass

No. 1 heavy copper and wire 16½—17
No. 2 heavy coper and wire 15½—16
Light copper ..... 14¼—14¾
Auto radiators (unsweated). 10 —10½
No. 1 composition ..... 13¾—14
No. 1 composition turnings.. 13¼—13½
Clean red car boxes ..... 12 —12½
Cocks and faucets ..... 10½—11
Mixed heavy yellow brass... 8½— 9
Old rolled brass ..... 9½—10
Brass pipe ..... 9¾—10½
New soft brass clippings .... 12½—13
Brass rod ends ..... 13½—13¾
No. 1 brass rod turnings... 13 —13½

Aluminum

Alum. pistons free of struts.. 5½— 6
Aluminum crankcases ..... 7 — 7¼
2S aluminum clippings ..... 8½— 9
Old sheet & utensils..... 7 — 7¼
Mixed borings and turnings. 2 — 2¼
Misc. cast aluminum ..... 7 — 7¼
Dural clips (24S) ..... 4½— 4¾

Zinc

New zinc clippings ..... 7½— 8
Old zinc ..... 5½— 6
Zinc routings ..... 2½— 2¾
Old die cast scrap ..... 3½— 4

Nickel and Monel

Pure nickel clippings ..... 19½—20½
Clean nickel turnings ..... 16½—17½
Nickel anodes .....19½—20½
Nickel rod ends ..... 19 —20
New Monel clippings .....14 —15
Clean Monel turnings ..... 9 —10
Old sheet Monel ..... 12 —13
Old Monel castings .....10 —11
Inconel clippings .....10 —11
German silver clippings, mixed10½—11
German silver turnings, mixed 7 — 7¼

Lead

Soft scrap lead ..... 12½—13
Battery plates (dry) ..... 7½— 7¾

Miscellaneous

Block tin ..... 67 —68
No. 1 pewter ..... 50 —52
No. 1 auto babbitt ..... 40 —43
Mixed common babbitt ..... 13½—14
Solder joints ..... 15½—16
Siphon tops ..... 40 —42
Small foundry type ..... 15½—16
Monotype ..... 13¼—13¾
Lino and stereotype ..... 12¾—13¼
Electrotype ..... 10¾—11¼
New type shell cuttings ..... 10½—11
Clean hand picked type shells. 5½— 6
Lino and stereo dross..... 5½— 6
Electro dross ..... 3¼— 3½

Lead Products

(Cents per lb)

F.o.b. shipping point freight collect. Freight equalized with nearest free delivery point.

Full lead sheets 18.25
Cut lead sheets 18.75
Lead pipe, manufacturing point... 17.50
Lead traps and bends .....List +42%
Combination lead and iron bends and ferrules, also combination lead and iron ferrules ....List +42%
Lead wool 19.50

SCRAP

. . . News and Market Activities

Steel Prices Dip a Bit; Cast Grades Easier

New York

• • • For the first time in months, scrap price movements were generally slight. Where there were changes, however, the trend was down. No. 1 steel was firm at Pittsburgh, Philadelphia, Detroit, and Cleveland. At Chicago it was off just 50¢. It was also quoted lower at New York, Boston, Birmingham, Cincinnati and St. Louis and Buffalo.

Declines in the lighter end of the steel scrap list were chalked up in almost all markets. The No. 2 heavy melting steel price differential first reported in the East, appeared this week in Chicago.

Cast grades were softer almost everywhere though they have never displayed the weakness shown by steel scrap during the past few weeks. Cast price declines were posted in Pittsburgh, Philadelphia, New York, Buffalo and Birmingham. The first two were off $1 on No. 1 cupola cast; the others had larger declines.

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PITTSBURGH—The scrap market took a breather this week and held at the last quoted prices on openhearth grades, but the tendency is still downward. The establishment of a differential in the East may be reflected here shortly or may open the way for Western Pennsylvania consumers to buy in that area again. The cast grades are softening in price, but not to the extent that the openhearth grades did during the past 3 weeks. Railroad scrap prices are down, with the exception of heavy melting. In this case, the decline was not as great as anticipated and the quoted price had to be adjusted upward on the basis of sales. Resistance to lower prices is building up in this area, but the chances are that it will not be strong enough to ward off further price cuts. Mills still refuse to buy heavily, and one major consumer has ordered shipment on old, high-priced orders. This may tend to bolster the market.

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CHICAGO—As has been expected the market slid off further in the past week. In addition the old practice of differentials in heavy melting items was reinstated, with but a dollar difference between dealer and industrial scrap. Railroad specialties continue to vary widely. Inland had not ordered withholding of scrap shipments early in the week. Two typographical errors were made in prices reported for May 1st. Galvanized bundles should have read $28 to $28.50 and machine shop turnings $25 to $25.50.

PHILADELPHIA — With mills ordering in light volume, prime heavy melting grades held previous levels last week and secondary grades dropped slightly. Mixed borings and turnings sold well below machine shop which held at last week's price. All cast grades declined $1. Low phos grades and railroad specialties dropped more than other grades Malleable held its price as it continues in short supply. J. A. Roebling's Sons, on strike, held up scrap shipments but not pig iron. The Pennsylvania Railroad list closing May 8 offers 27,000 tons, more than any recent offering. The Baltimore and Ohio list offers 5000 tons. Scrap shipments are reported to be off and dealers are said to be backing away from purchases of unprepared scrap due to the falling market.

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NEW YORK—The price spread this week is broad because there are still some old orders being run off while some new lower priced business is on the books. The average buying price for No. 1 steel is off $1.25. Some buyers with new orders will pay only $23.25 for No. 2 heavy melting; others with old orders will pay the No. 1 steel price. No. 1 cast was off about $4.50 because big consumers were not buying. Collections of light iron are still good; overall volume is off a trifle.

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DETROIT—Following last week's price drop of $5 per ton the Detroit scrap market appears to be stabilized for the moment at approximately $24.50 to $25 for openhearth grades. One large mill buyer is back in the market at $27 delivered while another large local user is not yet ready to place an order covering scrap that may be required in May in addition to present ample supplies. Earmarking of scrap by industry continues so no lists are being published again this month. There are scattered reports that allocated scrap has been turned down by several mills because of price but this is the only indication that earmarking will be abandoned in the near future. Cast grade prices are unchanged.

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CLEVELAND—Mills placed the first of the new "cheap" orders last weekend and the assortment of prices paid for identical grades is ample evidence that the market is far from stabilized. Except for the foundry grades, the market is weak and some brokers are trying to capitalize on this to get their buying prices down. Most of the buying done in the last few days has been largely "in the dark" as far as prices go, and according to some sources, there will be little real price testing before June.

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BOSTON—A Worcester consumer, on new business, bought heavy steel at $24.25 a ton for which brokers pay $23.50 or less. On old Worcester orders brokers pay $26, $27 and $28 for prompt shipment. Another consumer that held up deliveries is now taking heavy steel on old orders on a $31 f.o.b. basis. Until old orders are eliminated prices will remain confused. However, current undertone is weak. Some mills have rejected old order shipments. Small foundries lacking pig iron are paying $50 for cast, general market for which is now $45.

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BUFFALO—Scrap buyers were moving cautiously this week, apparently content to let the market find its own level. Prices on some grades declined further, with heavy openhearth material down $1 from the former price. Cupola cast was off $2 and rail specialties $3 to $5. Two of the leading mills placed orders for the openhearth material.

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CINCINNATI—Prices on all items except low phos have been reduced sharply during the current week. Cast grades, by and large, have resisted the general down trend. Some increase in activity in the market was noted during the past week, in an attempt to get shipments under way before the expiration of contracts, but new purchasing has been very slow. Current purchases to fill normal needs have been in small amounts since most consumers in the area are using their present fairly substantial inventories in the hope of further price reductions.

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BIRMINGHAM—Scrap prices continue to decline in this market with No. 1 railroad heavy melting and No. 1 heavy melting down $2 per ton from last week's quotation. Sellers are encountering a very strong buyers' resistance and very little material of any grade is moving. Plenty of scrap, particularly shipyard scrap at Gulf ports, is available.

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ST. LOUIS—The market is weaker and prices are lower. Shipments were heavy when prices were higher and mills are well supplied with material. Furthermore operations in one plant are off because of a machinists' strike and in another because furnaces are down for repairs. Pressure from outside markets which forced prices up several weeks ago is off.

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TORONTO — Shortage of scrap iron and steel is becoming more critical in Canada and unless the supply position improves more rapidly in the future than it has in the past, production of iron and steel as well as foundry products may be seriously affected. Receipts over the past few days have shown minor betterment, chiefly owing to shipments of scrap from rural districts that had been accumulating during the winter. However, no special effort is being made to gather in the large supply of scrap from the farms, which is being neglected by collectors who point out that prevailing ceiling prices are too low.

IRON AND STEEL SCRAP PRICES

Going prices as obtained in the trade by THE IRON AGE, based on representative tonnages.

PITTSBURGH

Per gross ton delivered to consumer:

No. 1 hvy. melting	$29.50 to $30.00
RR. hvy. melting	32.00 to 32.50
No. 2 hvy. melting	29.50 to 30.00
RR. scrap rails	40.00 to 41.00
Rails 2 ft. and under	42.00 to 42.50
No. 1 comp'd bundles	29.50 to 30.00
Hand bdld. new shts.	29.50 to 30.00
Hvy. axle turn	29.00 to 29.50
Hvy. steel forge turn.	29.00 to 29.50
Mach. shop turn	25.50 to 26.00
Short shov. turn	28.50 to 29.00
Mixed bor. and turn	25.50 to 26.00
Cast iron borings	26.50 to 27.00
No. 1 cupola cast	41.00 to 42.00
Heavy breakable cast	30.00 to 30.50
Malleable	44.00 to 45.00
RR. knuck and coup.	42.00 to 42.50
RR. coil springs	42.00 to 42.50
Rail leaf springs	42.00 to 42.50
Rolled steel wheels	42.00 to 42.50
Low phos	37.50 to 38.50

CHICAGO

Per gross ton delivered to consumer:

No. 1 hvy. melting	$29.50 to $30.00
No. 2 hvy. melting	28.50 to 29.00
No. 1 bundles	29.50 to 30.00
No. 2 dealers' bundles	28.50 to 29.00
Bundled mach. shop turn.	28.50 to 29.00
Galv. bundles	26.50 to 27.00
Mach. shop turn	23.50 to 24.00
Short shov. turn	25.50 to 26.00
Cast iron borings	24.50 to 25.00
Mix. borings & turn.	23.50 to 24.00
Low phos. hvy. forge	33.50 to 34.00
Low phos. plates	31.00 to 31.50
No. 1 RR. hvy. melt	29.50 to 30.00
Rerolling rails	36.00 to 36.50
Miscellaneous rails	34.00 to 35.00
Angles & splice bars	35.50 to 36.00
Locomotive tires, cut	38.00 to 39.00
Cut bolster & side frames	35.50 to 36.00
Standard stl. car axles	38.00 to 38.50
No. 3 steel wheels	35.00 to 35.50
Couplers & knuckles	36.00 to 36.50
Malleable	45.00 to 47.00
No. 1 mach. cast	39.00 to 40.00
Rails 2 ft. and under	38.00 to 40.00
No. 1 agricul. cast	37.00 to 37.50
Hvy breakable cast	34.00 to 34.50
RR. grate bars	32.00 to 32.50
Cast iron brake shoes	36.00 to 36.50
Cast iron carwheels	34.50 to 35.00

CINCINNATI

Per gross ton delivered to consumer:

No. 1 hvy. melting	$27.00 to $28.00
No. 2 hvy. melting	27.00 to 28.00
No. 1 bundles	27.00 to 28.00
No. 2 bundles	27.00 to 28.00
Mach. shop turn	20.00 to 21.00
Shoveling turn.	22.00 to 23.00
Cast iron borings	20.00 to 21.00
Mixed bor. & turn	20.00 to 21.00
Low phos. plate	37.00 to 38.00
No. 1 cupola cast	43.00 to 45.00
Hvy. breakable cast	34.00 to 35.00
Scrap rails	38.00 to 39.00

BOSTON

Dealers' buying prices per gross ton, f.o.b. cars

No. 1 hvy. melting	$23.00 to $23.50
No. 2 hvy. melting	23.00 to 23.50
Nos. 1 and 2 bundles	23.00 to 23.50
Busheling	21.00 to 21.50
Turnings, shovelings	19.00
Machine shop turn	18.00
Mixed bor. & turn	18.00
Cl'n cast. chem. bor	21.00 to 22.00
No. 1 machinery cast	45.00
No. 2 machinery cast	45.00
Heavy breakable cast	45.00
Stove plate	45.00

DETROIT

Per gross, ton, brokers' buying prices, f.o.b. cars:

No. 1 hvy. melting	$24.50 to $25.00
No. 2 hvy. melting	24.50 to 25.00
No. 1 bundles	24.50 to 25.00
New busheling	24.50 to 25.00
Flashings	24.50 to 25.00
Mach. shop turn	21.50 to 22.00
Short shov. turn	22.50 to 23.00
Cast iron borings	22.50 to 23.00
Mixed bor. & turn	22.50 to 23.00
Low phos. plate	26.50 to 27.00
No. 1 cupola cast	33.00 to 35.00
Hvy. breakable cast	26.00 to 28.00
Stove plate	30.00 to 32.00
Automotive cast	33.00 to 35.00

PHILADELPHIA

Per gross ton delivered to consumer:

No. 1 hvy. melting	$29.50 to $30.00
No. 2 hvy. melting	28.50 to 29.00
No. 1 bundles	29.50 to 30.00
No. 2 bundles	27.00 to 27.50
Mach. shop turn	22.00 to 23.00
Shoveling turn.	23.00 to 23.50
Mixed bor. & turn.	20.50 to 21.00
Clean cast chemical bor.	29.50 to 30.00
No. 1 cupola cast.	44.00 to 45.00
Hvy. breakable cast	39.00 to 40.00
Cast. charging box	39.00 to 40.00
Clean auto cast	44.00 to 45.00
Hvy. axle forge turn.	29.50 to 30.00
Low phos. plate	33.50 to 34.00
Low phos. punchings	33.50 to 34.00
Low phos. bundles	31.50 to 32.00
RR. steel wheels	35.00 to 36.00
RR. coil springs	35.00 to 36.00
RR. malleable	50.00 to 52.00

ST. LOUIS

Per gross ton delivered to consumer:

No. 1 hvy. melting	$31.00 to $31.50
Bundled sheets	28.50 to 29.00
Mach. shop turn	20.00 to 22.00
Locomotive tires, uncut	34.00 to 35.00
Mis. std. sec. rails	32.00 to 33.00
Rerolling rails	33.00 to 34.00
Steel angle bars	38.00 to 39.00
Rails 3 ft. and under	39.00 to 40.00
RR. steel springs	37.00 to 38.00
Steel car axles	38.00 to 39.00
Stove plate	35.00 to 36.00
Grate bars	35.00 to 36.00
Brake shoes	35.00 to 36.00
Malleable	47.00 to 49.00
Cast iron car wheels	41.00 to 42.00
No. 1 machinery cast	37.00 to 38.00
Breakable cast	32.00 to 33.00

BIRMINGHAM

Per gross ton delivered to consumer:

No. 1 hvy. melting	$27.00
No. 2 hvy. melting	27.00
No. 2 bundles	27.00
No. 1 busheling	27.00
Long turnings	22.00
Shoveling turnings	24.00
Cast iron borings	23.00
Bar crops and plate	$29.00 to 30.00
Structural and plate	29.00 to 30.00
No. 1 cast	36.00 to 37.00
Stove plate	34.00 to 35.00
No. 1 RR hvy. melt	28.00
Steel axles	30.00 to 31.00
Scrap rails	30.00 to 31.00
Rerolling rails	32.00 to 33.00
Angles & splice bars	29.00 to 30.00
Rails 3 ft. & under	29.00 to 30.00
Cast iron carwheels	30.00 to 31.00

YOUNGSTOWN

Per gross ton delivered to consumer:

No. 1 hvy. melting	$30.50 to $31.50
No. 2 hvy. melting	30.50 to 31.50
Low phos. plate	36.00 to 36.50
Mach. shop turn.	25.50 to 26.00
Short shov. turn	26.50 to 27.00
Cast iron borings	25.50 to 26.00
Elec. furnace punch	36.00 to 36.50

NEW YORK

Brokers' buying prices per gross ton, on cars:

No. 1 hvy. melting	$24.00 to $25.50
No. 2 hvy. melting	23.25 to 25.50
No. 2 bundles	23.00 to 24.25
Comp. galv. bundles	21.00 to 22.25
Mach. shop turn	17.50 to 18.75
Mixed bor. & turn	17.50 to 18.75
Shoveling turn.	19.00 to 20.75
No. 1 cupola cast	34.00 to 35.00
Hvy. breakable cast	33.00 to 34.00
Charging box cast	33.00 to 34.00
Stove plate	33.00 to 34.00
Clean auto cast	34.00 to 35.00
Unstrip. motor blks.	30.00 to 32.00
Cl'n chem. cast bor.	22.50 to 23.00

BUFFALO

Per gross ton delivered to consumer:

No. 1 hvy. melting	$29.00 to $30.00
No. 2 hvy. melting	29.00 to 30.00
No. 1 bundles	29.00 to 30.00
No. 2 bundles	29.00 to 30.00
No. 1 busheling	29.00 to 30.00
Mach. shop turn	21.00 to 22.00
Shoveling turn.	23.00 to 24.00
Cast iron borings	21.00 to 22.00
Mixed bor. & turn.	21.00 to 22.00
No. 1 cupola cast	35.00 to 38.00
Charging box cast	29.00 to 30.00
Stove plate	30.00 to 35.00
Clean auto cast	35.00 to 38.00
Malleable	45.00 to 47.00
Low phos. plate	32.00 to 34.00
Scrap rails	32.00 to 35.00
Rails 3 ft. & under	37.00 to 38.00
RR. steel wheels	37.00 to 38.00
Cast iron carwheels	37.00 to 38.00
RR. coil & leaf spgs.	37.00 to 38.00
RR. knuckles & coup.	37.00 to 38.00

CLEVELAND

Per gross ton delivered to consumer:

No. 1 hvy. melting	$29.00 to $29.50
No. 2 hvy. melting	29.00 to 29.50
Compressed sheet stl.	29.00 to 29.50
Drop forge flashings	29.00 to 29.50
No. 2 bundles	29.00 to 29.50
Mach. shop turn.	24.00 to 24.50
Short shovel.	26.00 to 26.50
No. 1 busheling	29.00 to 29.50
Steel axle turn.	29.00 to 29.50
Cast iron borings	25.00 to 25.50
Mixed bor. & turn.	25.00 to 25.50
No. 1 machinery cast	40.00 to 42.00
Malleable	50.00 to 55.00
RR. cast	40.00 to 41.00
Railroad grate bars	37.00 to 38.00
Stove plate	37.00 to 38.00
RR. hvy. melting	32.00 to 32.50
Rails 3 ft. & under	43.00 to 44.00
Rails 18 in. & under	44.00 to 45.00
Elec. furnace punch	33.50 to 34.00

SAN FRANCISCO

Per gross ton delivered to consumer:

No. 1 hvy. melting	$19.50
No. 2 hvy. melting	19.50
No. 2 bales	19.50
No. 3 bales	16.00
Mach. shop turn.	13.00
Elec. furn. 1 ft. und.	25.00
No. 1 cupola cast	$32.00 to 33.00
RR. hvy. melting	20.50

LOS ANGELES

Per gross ton delivered to consumer:

No. 1 hvy. melting	$19.50
No. 2 hvy. melting	19.50
No. 1 bales	19.50
No. 2 bales	19.50
No. 3 bales	16.00
Mach. shop turn.	14.50
No. 1 cupola cast	$35.00 to 36.00
RR. hvy. melting	20.50

SEATTLE

Per gross ton delivered to consumer:

No. 1 & No. 2 hvy. melt.	$20.00 to $21.00
Elec. furn. 1 ft. und.	23.00 to 25.00
No. 1 cupola cast	29.00
RR. hvy. melting	21.00 to 22.00

HAMILTON, ONT.

Per gross ton delivered to consumer:

Cast grades f.o.b. shipping point

Heavy melting	$17.50*
No. 1 bundles	17.50*
No. 2 bundles	17.00*
Mixed steel scrap	15.50*
Rails, remelting	18.50*
Rails, rerolling	21.50*
Bushelings	13.00*
Mixed borings & turnings	12.50*
Electric furnace bundles	20.50*
Manganese steel scrap	20.00*
No. 1 cast	19.00*
Stove plate	17.50*
Car wheels, cast	19.50*
Malleable iron	16.00*

* Ceiling price

Comparison of Prices . .

Advances over past week in Heavy Type, declines in *Italics*. Prices are f.o.b. major basing points. The various basing points for finished and semifinished steel are listed in the detailed price tables.

Flat-Rolled Steel: (cents per pound)	May 6, 1947	Apr. 29, 1947	Apr. 8, 1947	May 7, 1946
Hot-rolled sheets	2.50	2.50	2.50	2.425
Cold-rolled sheets	3.20	3.20	3.20	3.275
Galvanized sheets (10 ga.)	3.55	3.55	3.55	4.05*
Hot-rolled strip	2.50	2.50	2.50	2.35
Cold-rolled strip	3.20	3.20	3.20	3.05
Plates	2.65	2.65	2.65	2.50
Plates, wrought iron	5.95	5.95	5.95	4.112
Stain's c-r strip (No. 302) *24 ga	30.30	30.30	30.30	28.00
Tin and Terneplate: (dollars per base box)				
Tinplate, standard cokes.	$5.75	$5.75	$5.75	$5.00
Tinplate, electro (0.50 lb)	5.05	5.05	5.05	4.50
Special coated mfg. ternes	4.90	4.90	4.90	4.30
Bars and Shapes: (cents per pound)				
Merchant bars	2.60	2.60	2.60	2.50
Cold-finished bars	3.20	3.20	3.20	3.10
Alloy bars	3.05	3.05	3.05	2.92
Structural shapes	2.50	2.50	2.50	2.35
Stainless bars (No. 302)	26.00	26.00	26.00	24.00
Wrought iron bars	6.15	6.15	6.15	4.76
Wire and Wire Products: (cents per pound)				
Bright wire	3.30	3.30	3.30	3.05
Wire nails	3.75	3.75	3.75	3.25
Rails: (dollars per 100 lb)				
Heavy rails	$2.50	$2.50	$2.50	$43.39*
Light rails	2.85	2.85	2.85	49.18*
*per net ton				
Semifinished Steel: (dollars per gross ton)				
Rerolling billets	$42.00	$42.00	$42.00	$39.00
Sheet bars	50.00	50.00	50.00	38.00
Slabs, rerolling	42.00	42.00	42.00	39.00
Forging billets	50.00	50.00	50.00	47.00
Alloy blooms, billets, slabs	61.00	61.00	61.00	58.43
Wire Rods and Skelp: (cents per pound)				
Wire rods	2.55	2.55	2.55	2.30
Skelp	2.35	2.35	2.35	2.05

Pig Iron: (per gross ton)	May 6, 1947	Apr. 29, 1947	Apr. 8, 1947	May 7, 1946
No. 2, foundry, Phila.	$36.51	$36.51	$36.51	$28.34
No. 2, Valley furnace	33.50	33.50	33.50	26.50
No. 2, Southern, Cin'ti	34.75	34.75	34.75	26.94
No. 2, Birmingham	29.88	29.88	29.88	22.88
No. 2, foundry, Chicago†	33.00	33.00	33.00	26.50
Basic, del'd eastern Pa.	36.92	36.92	36.92	27.84
Basic, Valley furnace	33.00	33.00	33.00	26.00
Malleable, Chicago†	33.50	33.50	33.50	26.50
Malleable, Valley	33.50	33.50	33.50	26.50
Charcoal, Chicago	45.99	45.99	45.99	42.34
Ferromanganese‡	135.00	135.00	135.00	135.00

† The switching charge for delivery to foundries in the Chicago district is $1 per ton.
‡ For carlots at seaboard.

Scrap: (per gross ton)				
Heavy melt'g steel, P'gh.	$29.75	$29.75	$38.50	$20.00
Heavy melt'g steel, Phila.	29.75	29.75	34.50	18.75
Heavy melt'g steel, Ch'go	*29.75*	30.25	33.25	18.75
No. 1, hy. comp. sheet, Det.	24.75	24.75	32.25	17.32
Low phos. plate, Youngs'n	36.25	36.25	40.50	22.50
No. 1, cast, Pittsburgh	*41.50*	42.50	46.00	20.00
No. 1 cast, Philadelphia	*44.50*	45.50	49.00	20.00
No. 1, cast, Chicago	39.50	39.50	43.50	20.00
Coke, Connellsville: (per net ton at oven)				
Furnace coke, prompt	$10.50	$10.50	$9.00	$7.50
Foundry coke, prompt	11.25	11.25	10.25	9.00
Nonferrous Metals: (cents per pound to large buyers)				
Copper, electro., Conn.	21.50	21.50	21.50	12.00
Copper, Lake, Conn.	21.625	21.625	21.625	12.00
Tin, Straits, New York	80.00	80.00	80.00	52.00
Zinc, East St. Louis	10.50	10.50	10.50	8.25
Lead, St. Louis	14.80	14.80	14.80	6.35
Aluminum, virgin	15.00	15.00	15.00	15.00
Nickel, electrolytic	37.67	37.67	37.67	35.00
Magnesium, ingot	20.50	20.50	20.50	20.50
Antimony, Laredo, Tex.	33.00	33.00	33.00	14.50

Composite Prices . .

Starting with the issue of Apr. 22, 1943, the weighted finished steel index was revised for the years 1941, 1942 and 1943. See explanation of the change on p. 90 of the Apr. 22, 1943, issue. Index revised to a quarterly basis as of Nov. 16, 1944; for details see p. 98 of that issue. The finished steel composite prices for the current quarter are an estimate based on finished steel shipments for the previous quarter. These figures will be revised when the actual data of shipments for this quarter are compiled.

	FINISHED STEEL	PIG IRON	SCRAP STEEL
May 6, 1947	2.86354¢ per lb.	$33.15 per gross ton	*$29.75* per gross ton
One week ago	2.86354¢ per lb.	$33.15 per gross ton	$29.92 per gross ton
One month ago	2.86354¢ per lb.	$33.15 per gross ton	$35.42 per gross ton
One year ago	2.73011¢ per lb.	$26.12 per gross ton	$19.17 per gross ton

	FINISHED STEEL HIGH	FINISHED STEEL LOW	PIG IRON HIGH	PIG IRON LOW	SCRAP STEEL HIGH	SCRAP STEEL LOW
1947	2.86354¢	2.86354¢	$33.15 Mar. 11	$30.14 Jan. 7	$39.67 Mar. 18	$29.75 May 6
1946	2.83599¢ Dec. 31	2.54490¢ Jan. 1	30.14 Dec. 10	25.37 Jan. 1	31.17 Dec. 24	19.17 Jan. 1
1945	2.44104¢ Oct. 2	2.38444¢ Jan. 2	25.37 Oct. 23	23.61 Jan. 2	19.17 Jan. 2	18.92 May 22
1944	2.30837¢ Sept. 5	2.21189¢ Oct. 5	$23.61	$23.61	19.17 Jan. 11	15.76 Oct. 24
1943	2.29176¢	2.29176¢	23.61	23.61	$19.17	$19.17
1942	2.28249¢	2.28249¢	23.61	23.61	19.17	19.17
1941	2.43078¢	2.43078¢	$23.61 Mar. 20	$23.45 Jan. 2	$22.00 Jan. 7	$19.17 Apr. 10
1940	2.30467¢ Jan. 2	2.24107¢ Apr. 16	23.45 Dec. 23	22.61 Jan. 2	21.83 Dec. 30	16.04 Apr. 9
1939	2.35367¢ Jan. 3	2.26689¢ May 16	22.61 Sept. 19	20.61 Sept. 12	22.50 Oct. 3	14.08 May 16
1938	2.58414¢ Jan. 4	2.27207¢ Oct. 18	23.25 June 21	19.61 July 6	15.00 Nov. 22	11.00 June 7
1937	2.58414¢ Mar. 9	2.32263¢ Jan. 4	23.25 Mar. 9	20.25 Feb. 16	21.92 Mar. 30	12.67 June 9
1936	2.32263¢ Dec. 28	2.05200¢ Mar. 10	19.74 Nov. 24	18.73 Aug. 11	17.75 Dec. 21	12.67 June 8
1935	2.07642¢ Oct. 1	2.06492¢ Jan. 8	18.84 Nov. 5	17.83 May 14	13.42 Dec. 10	10.33 Apr. 29
1934	2.15367¢ Apr. 24	1.95757¢ Jan. 2	17.90 May 1	16.90 Jan. 27	13.00 Mar. 13	9.50 Sept. 25
1933	1.95578¢ Oct. 3	1.75836¢ May 2	16.90 Dec. 5	13.56 Jan. 3	12.25 Aug. 8	6.75 Jan. 3
1932	1.99196¢ July 5	1.83901¢ Mar. 1	14.81 Jan. 5	13.56 Dec. 6	8.50 Jan. 12	6.43 July 5
1931	1.99626¢ Jan. 13	1.86586¢ Dec. 29	15.90 Jan. 6	14.79 Dec. 15	11.33 Jan. 6	8.50 Dec. 29
1930	2.25488¢ Jan. 7	1.97319¢ Dec. 9	18.21 Jan. 7	15.90 Dec. 16	15.00 Feb. 18	11.25 Dec. 9
1929	2.31773¢ May 28	2.26498¢ Oct. 29	18.71 May 14	18.21 Dec. 17	17.58 Jan. 29	14.08 Dec. 8

Weighted index based on steel bars, shapes, plates, wire, rails, black pipe, hot and cold-rolled sheets and strip, representing 78 pct of the United States output. Index recapitulated in Aug. 28, 1941, issue.

Based on averages for basic iron at Valley furnaces and foundry iron at Chicago, Philadelphia, Buffalo, Valley and Birmingham.

Based on No. 1 heavy melting steel scrap quotations to consumers at Pittsburgh, Philadelphia and Chicago.

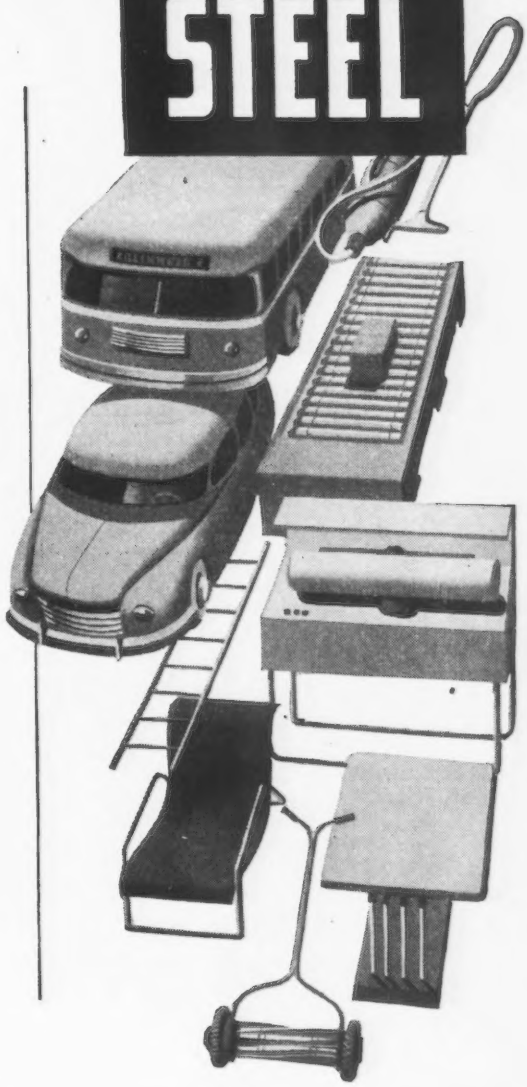
J&L ELECTRICWELD STEEL TUBING IS AVAILABLE TO YOU NOW

Manufacturers are taking advantage of the fact that J&L Electricweld Tubing is now available for early delivery. Design and production engineers know that the great strength of this light tubular section permits reduction in weight and bulk with saving in costs of material. It also can be fabricated economically.

For forming operations, the uniformity of cross-section and wall thickness of Electricweld Tubing makes it possible for products to conform to close tolerance limits. Electricweld Tubing can be altered in cross-section by any number of processes to meet requirements of design. It bends easily in all directions and can be readily joined by mechanical or welding methods.

Beauty and sales appeal in finished products are aided by the smooth, uniform surface of J&L Electricweld Tubing. It provides an ideal base for electro-plating, enameling, and painting. These finishes can be applied with a minimum of surface preparation.

For information on delivery of J&L Electricweld Tubing to increase your production and improve your products, contact the nearest sales office listed below.



JONES & LAUGHLIN STEEL CORPORATION
PITTSBURGH

SALES OFFICES: Atlanta • Baltimore • Boston • Buffalo • Chicago • Cincinnati • Cleveland Columbus • Dallas • Denver • Detroit • Harrisburg • Houston • Indianapolis • Los Angeles • Memphis Milwaukee • Minneapolis • New Haven • New Orleans • New York • N. Kansas City Philadelphia • Pittsburgh • St. Louis • San Francisco • Seattle • South Bend • Syracuse Toledo • Tulsa • Washington

Iron and Steel Prices . . .

Steel prices shown here are f.o.b basing points in cents per pound or dollars per gross ton. Extras apply. Delivered prices do not reflect 3 pct tax on freight. Industry practice has discontinued arbitrary f.o.b. prices at Gulf and Pacific Ports. Space limitations prevent quotation of delivered prices at major ports. (1) Commercial quality sheet grade; primes, 25c above base. (2) Commercial quality grade. (3) Widths up to 12-in. inclusive. (4) 0.25 carbon and less. (5) Applies to certain width and length limitations. (6) For merchant trade. (7) For straight length material only from producer to consumer. (8) Also shafting. For quantities of 20,000 lb to 89,999 lb. (9) Carload lot in manufacturing trade. (10) This base price for annealed, bright finish wire, commercial spring wire. (11) Boxed. (12) Produced to dimensional tolerances in AISI Manual Sec. 6 (13) Delivered San Francisco only: Includes 3 pct freight tax. (14) Delivered Kaiser Co. prices; includes 3 pct freight tax. (15) 0.035 to 0.075 in. thick by ¾ to 3½ in. wide. (16) Some producers are charging 2.75c. (17) Delivered Los Angeles; add ½c per 100 lb for San Francisco. (18) Delivered Los Angeles only. (19) Fabricated.

Basing Points	Pittsburgh	Chicago	Gary	Cleveland	Birmingham	Buffalo	Youngstown	Sparrows Point	Granite City	Middletown, Ohio		San Franc'co, Los Angeles, Seattle	DELIVERED TO Detroit	New York	Philadelphia
INGOTS Carbon, rerolling	($35.00 f. o. b. mill)														
Carbon, forging	$40.00	$40.00	$40.00	$40.00	$40.00	$40.00	$40.00								
Alloy	$52.00						Canton—$52.00)								
BILLETS, BLOOMS, SLABS Carbon, rerolling	$42.00	$42.00	$42.00	$42.00	$42.00	$42.00	(Provo—$53.20) $42.00	$42.00					$45.00		
Carbon, forging billets	$50.00	$50.00	$50.00	$50.00	$50.00	$50.00	(Provo—$81.20, Duluth—$52.00[13]) $50.00						$53.00		
Alloy	$61.00	$61.00				$61.00	(Bethlehem, Massillon, Canton—$61.00)						$64.00		
SHEET BARS							$53.00		Portsmouth, Ohio—$67.20						
PIPE SKELP	2.35¢	2.35¢					2.35¢	2.35¢	(Coatesville—2.35¢)						
WIRE RODS	2.55¢	2.55¢		2.55¢	2.55¢		(Worcester—2.65¢)					3.27¢[13]			
SHEETS Hot-rolled	2.50¢	2.50¢	2.50¢	2.50¢	2.50¢	2.50¢	2.50¢	2.50¢	2.875¢	2.50¢		3.24¢[17]	2.65¢	2.79¢	2.70¢
Cold-rolled [1]	3.20¢	3.20¢	3.20¢	3.20¢		3.20¢	3.20¢		3.30¢				3.35¢	3.61¢	3.58¢
Galvanized (10 gage)	3.55¢	3.55¢	3.55¢		3.55¢		3.55¢	3.55¢	3.65¢			4.32¢[17]		3.84¢	3.75¢
Enameling (12 gage)	3.55¢	3.55¢	3.55¢	3.55¢			3.55¢		3.65¢				3.70¢	3.95¢	3.93¢
Long ternes [2] (10 gage)	3.55¢	3.55¢	3.55¢											3.95¢	3.91¢
STRIP Hot-rolled [3]	2.50¢	2.50¢	2.50¢	2.50¢[15]	2.50¢		2.50¢						2.65¢	2.93¢	2.88¢
Cold-rolled [4]	3.20¢	3.30¢		3.20¢			3.20¢			(Worcester—3.40¢)			3.35¢	3.61¢	3.58¢
Cooperage stock	2.80¢	2.80¢			2.80¢		2.80¢							3.09¢	
TINPLATE Standard cokes, base box	$5.75	$5.75	$5.75		$5.85			$5.85	$5.85		(Warren, Ohio—$5.75)		$6.157	$6.062[11]	
Electro, box { 0.25 lb. / 0.50 lb. / 0.75 lb. }	Deduct 90¢ from standard coke base box price. Deduct 70¢ from standard coke base box price. Deduct 50¢ from standard coke base box price.														
BLACKPLATE, 29 gage [5]	3.60¢	3.60¢	3.60¢		3.70¢			3.76¢	3.70¢		(Warren, Ohio—$5.75)		3.99¢	3.90¢	
BLACKPLATE, CANMAKING 55 lb. to 70 lb. / 75 lb. to 95 lb. / 100 lb. to 118 lb.	Deduct $1.55 from standard coke base box. Deduct $1.65 from standard coke base box. Deduct $1.55 from standard coke base box.														
TERNES, MFG., Special coated	Deduct 85¢ from standard coke base box price.														
BARS Carbon steel	2.60¢	2.60¢	2.60¢	2.60¢	2.60¢	2.60¢	2.60¢					3.285¢	2.75¢	3.01¢	2.98¢
Rail steel [6, 19]	2.95¢	2.95¢	2.95¢	2.95¢	2.95¢	2.95¢									
Reinforcing (billet) [7]	2.45¢	2.45¢	2.45¢	2.45¢	2.45¢	2.45¢	2.45¢	2.45¢				2.985¢		2.74¢	2.65¢
Reinforcing (rail) [7, 16]	2.60¢	2.60¢	2.60¢	2.60¢	2.60¢	2.60¢	2.60¢								
Cold-finished [8]	3.20¢	3.20¢	3.20¢	3.20¢		3.20¢							3.35¢	3.61¢	3.58¢
Alloy, hot-rolled	3.05¢	3.05¢				3.05¢	3.05¢	(Bethlehem, Massillon, Canton—3.05¢)					3.20¢		3.19¢
Alloy, cold-drawn	3.80¢	3.80¢	3.80¢	3.80¢		3.80¢							3.95¢		
PLATE Carbon steel [12]	2.65¢	2.65¢	2.65¢	2.65¢	2.65¢		2.65¢	(Coatesville, Claymont—2.80¢, Geneva, Utah—2.80¢) 2.65¢				3.46¢[14]		2.87¢	2.85¢
Floor plates	3.90¢	3.90¢												4.30¢	4.28¢
Alloy	3.79¢	3.79¢			(Coatesville—4.10¢)									4.01¢	3.895¢
SHAPES, Structural	2.50¢	2.50¢	2.50¢		2.50¢	2.50¢	(Geneva, Utah—2.65¢) (Bethlehem—2.50¢)					3.17¢[18]		2.70¢	2.64¢
SPRING STEEL, C-R 0.26 to 0.40 carbon	3.20¢			3.20¢			(Worcester—3.40¢)								
0.41 to 0.60 carbon	4.70¢			4.70¢			(Worcester—4.90¢)								
0.61 to 0.80 carbon	5.30¢			5.30¢			(Worcester—5.50¢)								
0.81 to 1.00 carbon	6.80¢			6.80¢			(Worcester—7.00¢)								
Over 1.00 carbon	9.10¢			9.10¢			(Worcester—9.30¢)								
MANUFACTURERS' WIRE [9] Bright [10]	3.30¢	3.30¢		3.30¢	3.30¢		(Worcester—3.40¢, Duluth—3.35¢)					5.63¢[13]		3.71¢	3.68¢
Galvanized	Add proper size extra and galvanizing extra to Bright Wire Base														
Spring (high carbon)	4.25¢	4.25¢		4.25¢			(Worcester—4.35¢, Duluth—4.50¢)			(Trenton—4.50¢)		5.24¢[13]		4.66¢	4.595¢
PILING, Steel sheet	3.00¢	3.00¢				3.00¢								3.41¢	3.36¢

CORROSION AND HEAT RESISTANT STEELS

In cents per pound, f.o.b. basing point

Basing Point	Chromium Nickel		Straight Chromium			
	No. 304	No. 302	No. 410	No. 430	No. 442	No. 446
Ingot, P'gh, Chi, Canton, Balt, Reading, Ft. Wayne, Phila.	Subject to negotiation			Subject to negotiation		
Blooms, P'gh, Chi, Canton, Phila, Reading, Ft. Wayne, Balt.	22.99	24.67	17.01	17.47	20.69	25.29
Slabs, P'gh, Chi, Canton, Balt, Phila, Reading	22.99	24.67	17.01	17.47	20.69	25.29
Billets, P'gh, Chi, Canton, Watervliet, Syracuse, Balt	Subject to negotiation			Subject to negotiation		
Billets, forging, P'gh, Chi, Canton, Dunkirk, Balt, Phila, Reading, Water, Syracuse, Ft. Wayne, Titusville	23.00	22.50	17.50	17.50	21.00	25.50
Bars, h-r, P'gh, Chi, Canton, Dunkirk, Watervliet, Syracuse, Balt, Phila, Reading, Ft. Wayne, Titusville	27.50	26.00	20.50	21.00	24.50	30.00
Bars, c-f, P'gh, Chi, Cleve, Canton, Dunkirk, Syracuse, Balt, Phila, Reading, Ft. Wayne, Watervliet	27.50	26.00	20.50	21.00	24.50	30.00
Plates, P'gh, Middletown, Canton	31.50	29.50	23.50	24.00	28.00	33.00
Shapes, structural, P'gh, Chi	27.50	26.00	20.50	21.00	24.50	30.00
Sheets, P'gh, Chi, Middletown, Canton, Balt	39.00	37.00	29.00	31.50	35.50	39.50
Strip, h-r, P'gh, Chi, Reading, Canton, Youngstown	25.50	23.50	18.50	19.00	23.00	38.00
Strip, c-r, P'gh, Cleve, Newark, N. J., Reading, Canton, Youngstown	32.50	30.50	24.00	24.50	35.00	56.50
Wire, c-d, Cleve, Dunkirk, Syracuse, Balt, Reading, Canton, P'gh, Newark, N. J. Phila., Ft. Wayne	27.50	26.00	20.50	21.00	24.50	30.00
Wire, flat, c-r, Cleve, Balt, Reading, Dunkirk, Canton	32.48	30.30	23.80	24.34	34.62	56.26
Rod, h-r, Syracuse	27.05	25.97	20.02	20.56	24.34	29.75
Tubing, seamless, P'gh, Chi, Canton, (4 to 6 in.)	72.09	72.09	.....	68.49	.....	.....

TOOL STEEL

*(F.o.b. Pittsburgh, Bethlehem, Syracuse, Dunkirk. *Also Canton, Ohio)*

W	Cr	V	Mo		Base per lb
18	4	1	—	.....	74¢
1.5	4	1.5	8	.....	59¢
6	4	2	6	.....	63¢
High-carbon-chromium*				.....	47¢
Oil hardening manganese*				.....	26¢
Special carbon*				.....	24¢
Extra carbon*				.....	20¢
Regular carbon*				.....	16¢

Warehouse prices on and east of Mississippi are 2¢ per lb. higher; west of Mississippi, 4¢ higher.

ELECTRICAL SHEETS

Base, all grades f.o.b. Pittsburgh

	Per lb
Field grade	4.20¢
Armature	4.50¢
Electrical	5.00¢
Motor	5.75¢
Dynamo	6.45¢
Transformer 72	6.95¢
Transformer 65	7.65¢
Transformer 58	8.35¢
Transformer 52	9.15¢

F.o.b. Chicago and Gary, field grade through motor; f.o.b. Granite City, add 10¢ per 100 lb on field grade to and including dynamo.

RAILS, TRACK SUPPLIES

(F.o.b. mill)

Standard rails, heavier than 60 lb	
No. 1 O.H., per 100 lb	$2.50
Angle splice bars, 100 lb	3.00
(F.o.b. basing points)	*per 100 lb*
Light rails (from billets)	$2.85
Light rails (from rail steel), f.o.b. Williamsport, Pa.	2.95

	Base per lb
Cut spikes	4.50¢
Screw spikes	6.40¢
Tie plate, steel	2.80¢
Tie plates, Pacific Coast	2.95¢
Track bolts	6.50¢
Track bolts, heat treated, to rail roads	6.75¢
Track bolts, jobbers discount	63-5

Basing points, light rails, Pittsburgh, Birmingham; cut spikes and tie plates—Pittsburgh, Chicago, Portsmouth, Ohio, Weirton, W. Va., St. Louis, Kansas City, Minnequa, Colo., Birmingham and Pacific Coast ports; tie plates alone—Steelton, Pa., Buffalo. Cut spikes alone—Youngstown, Lebanon, Pa., Richmond, add 25¢.

ROOFING TERNEPLATE

(F.o.b. Pittsburgh, 112 sheets)

	20x14 in.	20x28 in.
8-lb coating I.C.	$6.75	$13.50

CLAD STEEL

Base prices, cents per pound

Stainless-clad	Plate	Sheet
No. 304, 20 pct, f.o.b. Pittsburgh, Washington, Coatesville, Pa.	*24.00	*22.00
Nickel-clad 10 pct, f.o.b. Coatesville, Pa.	21.50	....
Inconel-clad 10 pct, f.o.b. Coatesville	30.00	....
Monel-clad 10 pct, f.o.b. Coatesville	29.00	....
Aluminized steel Hot dip, 20 gage, f.o.b. Pittsburgh	....	9.00

*Includes annealing and pickling, or sandblasting.

MERCHANT WIRE PRODUCTS

To the dealer f.o.b. Pittsburgh, Chicago, Cleveland, Birmingham, Duluth

	Base per keg	Delivered San Francisco
Standard, galvanized and coated nails	$3.75†	$4.83
Cut nails, carloads, Pittsburgh base	5.30	....

†10¢ additional at Cleveland, 30¢ at Worcester.

	Base per 100 lb	
Annealed fence wire	$3.95‡	$4.96
Annealed galv. fence wire	4.40‡	5.41

‡10¢ additional at Worcester.

To the dealer f.o.b. Pittsburgh, Chicago, Birmingham

	Base column	
Woven wire fence*	84	107
Fence posts, carloads	90††	...
Single loop bale ties	86	110
Galvanized barbed wire**	94	114
Twisted barbless wire	94	...

* 15½ gage and heavier. ** On 80-rod spools in carload quantities. †† Pittsburgh, Duluth.

HIGH STRENGTH, LOW ALLOY STEELS

base prices, cents per pound

Steel	Alde-cor	Corten	Double Strength No. 1	Dyn-alloy	HI Steel	Mayari R	Otis-coloy	Yoloy	Y-50	NAX High Tensile
Producer	Repub-lic	Carnegie-Illinois, Republic	Repub-lic	Alan Wood	Inland	Bethle-hem	Jones & Laughlin	Youngs-town Sheet & Tube	Amer-ican Rolling Mill	Great Lakes Steel
Plates	4.10	4.10	4.10	4.10	4.10	4.10	4.10	4.10	....	4.10
Sheets										
Hot-rolled	3.85	3.85	3.85	3.85	3.85	3.85	3.85	3.85	....	3.75
Cold-rolled	4.75	4.75	4.75	....	4.75	4.75	4.75	4.75	5.225*	4.55
Galvanized	....	5.40	....	....	....	5.40	....	....	....	....
Strip										
Hot-rolled	3.85	3.85	3.85	....	3.85	3.85	3.85	3.85	....	3.75
Cold-rolled	....	....	4.75	....	....	4.75	4.75	4.75	5.00*	4.55†
Shapes	....	3.85	....	....	3.85	3.85	3.85	3.85	....	....
Beams	....	3.85	....	....	....	3.85	....	....	....	....
Bars										
Hot-rolled	4.00	4.00	4.00	....	....	4.00	4.00	4.00	....	4.00
Cold-rolled	....	....	....	....	....	....	....	4.60	....	....
Bar shapes	....	4.00	....	....	4.00	4.00	4.00	4.00	....	....

* 21 gage and lighter. † Pittsburgh, add 0.10¢ at Chicago and Gary.

PIPE AND TUBING

Base discounts. F.ob. Pittsburgh and Lorain, steel buttweld and seamless. Others f.o.b. Pittsburgh only

Base price, $200.00 per net ton

Standard, threaded & coupled

Steel, buttweld	Black	Galv.
⅛-in.	55½	41
¼-in.	58½	45
⅜ to 3-in.	60½	47½
Wrought Iron, buttweld		
⅛ in.	2	+20
¼ in.	11½	+10
⅜ and 1¼-in.	17	+ 2
1½-in.	22½	1½
2-in.	23	2
Steel, lapweld		
2-in.	53	39½
2½ and 3-in.	56	42½
3½ to 6-in.	58	44½
Wrought Iron, lapweld		
2-in.	14½	+ 5½
2½ to 3½-in.	17	+ 1½
4-in.	21	4
4½ to 8-in.	19	2½

Extra Strong, plain ends

Steel, buttweld		
⅛-in.	54½	41½
¼-in.	58½	45½
⅜ to 3-in.	60	48
Wrought Iron, buttweld		
⅛-in.	6½	+14
¼-in.	12½	+ 8
⅜ to 2-in.	22	2
Steel, lapweld		
2-in.	52	39½
2½ and 3-in.	56	43½
3½ to 6-in.	59½	47
Steel, seamless		
2-in.	51	38½
2½ and 3-in.	55	42½
3½ to 6-in.	58½	46
Wrought Iron, lapweld		
2-in.	17½	+ 2
2½ to 4-in.	26	8½
4½ to 6-in.	22	4

Basing discounts for standard pipe are for threads and couplings. For threads only, buttweld, lapweld and seamless pipe, one point higher discount (lower price) applies. For plain ends, buttweld, lapweld and seamless pipe 3-in. and smaller, three points higher discount (lower price) applies, while for lapweld and seamless 3½-in., and larger four points higher discount (lower price) applies. F.o.b. Gary prices are one point lower discount on all buttweld. On buttweld and lapweld steel pipe, jobbers are granted a discount of 5 pct. On l.c.l. shipments, prices are determined by adding 25 pct and 30 pct and the carload freight rate to the base card.

BOILER TUBES

Seamless steel and electric welded commercial boiler tubes and locomotive tubes, minimum wall. Net base prices per 100 ft, f.o.b. Pittsburgh in carload lots, cut length 4 to 24 ft, inclusive.

O.D. in.	Gage BWG	Seamless Hot-Rolled	Seamless Cold-Drawn	Electric Weld Hot-Rolled	Electric Weld Cold-Drawn
2	13	$15.29	$18.17	$15.00	$17.95
2½	12	20.57	24.43	20.11	24.07
3	12	22.87	27.18	22.26	26.68
3½	11	28.86	34.30	28.06	33.64
4	10	35.82	42.55	34.78	41.68

CAST IRON WATER PIPE

	Per net ton
6-in. to 24-in. del'd Chicago	$81.56
6-in. to 24-in. del'd New York	79.80
6-in. to 24-in., Birmingham	71.00
6-in. and larger, f.o.b. cars, San Francisco, Los Angeles for all rail shipment; rail and water shipment less	95.00

Class "A" and gas pipe, $5 extra; 4-in. pipe is $5 a ton above 6-in.

BOLTS, NUTS, RIVETS, SET SCREWS

Bolts and Nuts

(F.o.b. Pittsburgh, Cleveland, Birmingham or Chicago)

Machine and Carriage Bolts

Base discount less case lots

	Percent Off List
½ in. & smaller x 6 in. & shorter	55
Over 6 in.	45
9/16 & ⅝ in. x 6 in. & shorter	52
9/16 through 1 in. x over 6 in.	48
⅞ & 1 in. x in. and shorter	51
¾ in. x 6 in. & shorter	49
1⅛ in. and larger, all lengths	48
Lag, all diam over 6 in. long	48
Lag, all diam x 6 in. & shorter	50
Plow bolts	57

Nuts, Cold Punched or Hot Pressed

(Hexagon or Square)

	Percent Off List
½ in. and smaller	48
9/16 to 1 in. inclusive	47
1⅛ to 1½ in. inclusive	45
1⅝ in. and larger	44

On above bolts and nuts, excepting plow bolts, additional allowance of 15 pct for full container quantities. There is an additional 5 pct allowance for carload shipments.

Semifin. Hexagon Nuts

Base discount less case lots

	U.S.S.	S.A.E.
7/16 in. and smaller	..	51
½ in. and smaller	48	..
½ in. through 1 in.	..	48
9/16 in. through 1 in.	47	..
1⅛ in. through 1½ in.	45	46
1⅝ in. and larger	44	..

In full case lots, 15 pct additional discount. For 200 lb or more, freight allowed up to 50¢ per 100 lb, based on Cleveland, Chicago, Pittsburgh.

Stove Bolts

	Consumer
Packages, nuts separate	60 and 10
In bulk	74

On stove bolts freight allowed up to 65¢ per 100 lb based on Cleveland, Chicago, New York on lots of 200 lb or over.

Large Rivets (½ in. and larger)

	Base per 100 Lb
F.o.b. Pittsburgh, Cleveland, Chicago, Birmingham	$5.25
F.o.b. Lebanon, Pa.	5.40

Small Rivets (7/16 in. and smaller)

	Percent Off List
F.o.b. Pittsburgh, Cleveland, Chicago, Birmingham	55 and 5

Cap and Set Screws

(In packages)	Percent Off List Consumer
Hexagon head cap screws, coarse or fine thread, up to and incl. 1 in. x 6 in., SAE 1020, bright	56
¾ to 1 in. x 6 in., SAE 1035, heat treated	47
Set screws, cup and oval points	61
Milled studs	33
Flat head cap screws, listed sizes	21
Fillister head cap, listed sizes	40

Freight allowed up to 65¢ per 100 lb based on Cleveland, Chicago or New York on lots of 200 lb or over.

FLUORSPAR

Metallurgical grade, f.o.b. producing plant.

Effective CaF_2 Content:	Base price per short ton
70% or more	$33.00
65% but less than 70%	32.00
60% but less than 65%	31.00
Less than 60%	30.00

LAKE SUPERIOR ORES

(51.50% Fe, Natural Content, Delivered Lower Lake Ports)

	Per Gross Ton
Old range, bessemer	$5.95
Old range, non-bessemer	5.80
Mesabi, bessemer	5.70
Mesabi, non-bessemer	5.55
High phosphorus	5.55

Prices quoted retroactive to Jan. 1, 1947.

METAL POWDERS

Prices in cents per pound in ton lots, f.o.b. shipping point.

Brass, minus 100 mesh	23¢ to 27¢
Copper, electrolytic, 100 and 325 mesh	30¢ to 31½¢
Copper, reduced, 150 and 200 mesh	29¢ to 30½¢
Iron, commercial, 100, 200, 325, mesh 96 + % Fe	11¢ to 16¢
Swedish sponge iron, 100 mesh, c.i.f. N. Y., carlots, ocean bags	7.4¢ to 8.5¢
Iron, crushed, 200 mesh and finer, 90 + % Fe carload lots	5¢
Iron, hydrogen reduced, 300 mesh and finer, 98 + % Fe, drum lots	66¢
Iron, electrolytic, unannealed, 325 mesh and coarser, 99 + % Fe	25¢ to 31¢
Iron, electrolytic, annealed minus 100 mesh, 99 + % Fe	17¢
Iron carbonyl, 300 mesh and finer, 98-99.8 + % Fe	90¢ to $1.75
Aluminum, 100, 200 mesh, carlots	23¢ to 26¢
Antimony, 100 mesh	36.05¢
Cadmium, 100 mesh	$2.00
Chromium, 100 mesh and finer	$1.025
Lead, 100, 200 & 300 mesh	18.50¢ to 23.50¢
Manganese, minus 325 mesh and coarser	33¢
Nickel, 150 mesh	51½¢
Silicon, 100 mesh	18.15¢
Solder powder, 100 mesh	31½¢ plus metal
Tin, 100 mesh	90¢
Tungsten metal powder, 98%-99%, any quantity, per lb.	$2.80
Molybdenum powder, 99%, in 100-lb kegs, f.o.b. York, Pa., per lb.	$2.65
Under 100 lb	$2.90

COKE

	Net Ton
Furnace, beehive (f.o.b. oven)	
Connellsville, Pa.	$10.00 to $11.00
Foundry, beehive (f.o.b. oven)	
Connellsville, Pa.	11.00 to 12.00
Foundry, Byproduct	
Chicago, del'd	$16.10
Chicago, f.o.b.	15.10
New England, del'd	17.25
Seaboard, Kearney, N. J., f.o.b.	15.35
Philadelphia, del'd	15.46
Buffalo, del'd	16.14
Ashland, Ohio, f.o.b.	13.35
Painesville, Ohio, f.o.b.	14.60
Erie, del'd	15.75
Cleveland, del'd	15.90
Cincinnati, del'd	15.39
St. Louis, del'd	15.85
Birmingham, del'd	13.25

REFRACTORIES

(F.o.b. Works)

Fire Clay Brick

	Carloads, Per 1000
First quality, Ohio	$64.00
First quality, Pa., Md., Ky., Mo.	70.00
First quality, New Jersey	75.00
Sec. quality, Pa., Md., Ky., Mo.	64.00
Sec. quality, New Jersey	59.00
Sec. quality, Ohio	56.00
Ground fire clay, net ton, bulk	10.00

Silica Brick

Pennsylvania and Birmingham	$70.00
Chicago District	79.00
Silica cement, net ton (Eastern)	12.00
Chicago	13.50

Chrome Brick

	Per Net Ton
Standard chemically bonded, Balt., Plymouth Meeting, Chester	$59.00

Magnesite Brick

Standard, Balt. and Chester	$81.00
Chemically bonded, Baltimore	70.00

Grain Magnesite

Domestic, f.o.b. Balt. and Chester in sacks	$44.50
Domestic, f.o.b. Chewelah, Wash., in bulk	24.00
in sacks	28.00
Clinker (dead burned) dolomite, bulk, per net ton, f.o.b. Billmeyer, Pa., Millersville, O.	10.55
Midwest, add 10¢; Mo. Valley, add 20¢	

WAREHOUSE PRICES

Base prices, delivered metropolitan areas, per 100 lb.

CITIES	SHEETS			STRIP				BARS		ALLOY BARS			
	Hot-Rolled (10 gage)	Cold-Rolled (15 gage)	Galvanized (10 gage)	Hot-Rolled	Cold-Rolled	Plates	Standard Structural Shapes	Hot-Rolled	Cold-Finished	Hot-Rolled, A 4615 As-rolled	Hot-Rolled, A 4140-50 Ann.	Cold-Drawn, A 4615 †As-rolled	Cold-Drawn, A 4140-50 Ann.
Philadelphia	$4.24	$5.18	$5.29	$4.43	$5.28	$4.54	$4.22	$4.48	$5.38	$8.37	$8.37	$9.88	$9.88
New York	4.42	5.17[1]	5.47	4.62	5.40	4.72	4.37	4.62	5.42	8.42	8.42	9.92	9.92
Boston	4.50	5.12[12]	5.55[12]	4.65	6.356	4.80	4.47	4.62	5.468	8.62	8.62	9.97	9.97
Baltimore	4.09	....	5.14	4.40	....	4.39	4.34	4.45	5.35	....	....	....	....
Norfolk	4.35	....	....	....	....	4.50	4.50	4.75	5.50	....	....	....	....
Chicago	3.85	....	....	4.05	5.05	4.25	4.10	4.10	4.75	8.10	8.10	9.35	9.35
Milwaukee	4.199	4.799	5.249	4.199	....	4.499	4.249	4.249	5.149	8.399	8.399	9.649	9.649
Cleveland	4.00	4.60	5.238	4.188	4.85	4.30†	4.311	4.05	4.95	8.358	8.358	9.35	9.35
Buffalo	4.05	4.65	5.35	4.30	5.25	4.55	4.10	4.10	4.75	8.10	8.10	9.35	9.35
Detroit	4.15	4.75	5.42	4.34	5.24	4.59†	4.42	4.20	5.12	8.51	8.51	9.74	9.74
Cincinnati	4.116	4.716	5.166	....	....	4.803	4.444	4.403	5.303	....	....	....	....
St. Louis	4.199	4.799	5.424	4.199	5.424	4.499	4.249	4.249	5.324	8.574	8.574	9.824	9.824
Pittsburgh	4.00	4.60[1]	5.05	4.00	4.95	4.30	4.05	4.05	4.95	8.10	8.10	9.35	9.35
St. Paul	4.384[7]	5.034[1]	5.434[2]	4.404[7]	....	4.684[7]	4.434[7]	4.434[7]	5.726[6]	....	10.084[4]	....	11.726[6]
Duluth	....	....	....	....	....	....	....	....	....	....	....	....	....
Omaha	4.868	6.618[1]	5.918	4.868	....	5.168	4.918	4.918	5.818	....	....	....	....
Indianapolis	....	....	....	....	....	....	....	....	....	....	....	....	....
Birmingham	3.85[11]	....	5.20	4.00[11]	....	4.30[11]	4.05[11]	4.05[11]	5.83	....	....	....	....
Memphis	4.47	....	5.97	4.72	....	4.92	4.67	4.67	5.78	....	....	....	....
New Orleans	*4.46[11]	5.77[1]	....	....	....	4.83[11]	*4.68[11]	*4.78[11]	6.14	....	....	....	....
Los Angeles	5.35	7.00[1]	6.70	5.65	8.35[5]	5.20[12]	5.20[12]	5.10[13]	6.90[14]	9.65[10]	9.35	11.05	11.05
San Francisco	4.80[8]	6.30[9]	6.45	5.20[8]	....	5.00[8]	4.80[8]	4.75[8]	7.00[10]	....	....	....	....
Seattle	5.00	7.80	6.30	5.30[4]	....	5.25[4]	4.95[4]	5.00[4]	7.10	....	....	....	....
Portland	5.00[3]	....	6.25[9]	5.50[3]	....	5.40[3]	5.10[3]	5.10[3]	7.20	....	9.30	....	....
Salt Lake City	6.25	....	7.71	6.50	....	6.10	6.25	6.25	7.50[10]	....	....	....	....

BASE QUANTITIES

Standard unless otherwise keyed on prices.

HOT-ROLLED: Sheets, strip, plates, shapes and bars, 400 to 1999 lb.

COLD-ROLLED: Sheets, 400 to 1999 lb; strip, extras on all quantities; bars 1000 lb and over.

ALLOY BARS: 1000 lb and over.

GALVANIZED SHEETS: 450 to 1499 lb.

EXCEPTIONS: (1) 400 to 1499 lb; (2) 450 to 1499 lb; (3) 300 to 4999 lb; (4) 300 to 10,000 lb; (5) 2000 lb and over; (6) 1000 lb and over; (7) 400 to 14,999; (8) 400 lb and over; (9) 450 to 1499; (10) 500 to 999; (11) 400 to 3999; (12) 450 to 3749; (13) 400 to 1999; (14) 1500 and over.

* Add 46¢ for sizes not rolled in Birmingham.

† Up to ¾ in. thick and 90 in. wide.

PIG IRON PRICES

Dollars per gross ton. Delivered prices represent minimums.

BASING POINT PRICES						DELIVERED PRICES (BASE GRADES)							
Basing Point	Basic	No. 2 Foundry	Malleable	Bessemer	Low Phos.	Consuming Point	Basing Point	Freight Rate	Basic	No. 2 Foundry	Malleable	Bessemer	Low Phos.
Bethlehem	34.00	34.50	35.00	35.50	.....	Boston	Everett	$0.50 Arb.	29.50	30.00	30.50	31.00	.....
Birdsboro	34.00	34.50	35.00	35.50	39.00	Boston	Birdsboro-Steelton	4.82	.....	.....	.....	.....	43.82
Birmingham	29.38	29.68	.....	.....	.....	Brooklyn	Bethlehem	3.00	37.00	37.50	38.00	38.50	.....
Buffalo	32.50	33.00	33.50	.....	.....	Brooklyn	Birdsboro	3.50	.....	.....	.....	.....	42.50
Chicago	32.50	33.00	33.50	34.00	.....	Cincinnati	Birmingham	4.87	34.25	34.75	.....	.....	.....
Cleveland	32.50	33.00	33.50	.....	.....	Jersey City	Bethlehem	1.84	35.84	36.34	36.84	37.34	.....
Duluth	33.00	33.50	34.00	34.50	.....	Jersey City	Birdsboro	2.33	.....	.....	.....	.....	41.33
Erie	32.50	33.00	33.50	34.00	.....	Los Angeles	Provo	5.94	38.94	39.44	.....	.....	.....
Everett	29.00	29.50	30.00	30.50	.....	Mansfield	Cleveland-Toledo	2.33	34.83	35.33	35.83	36.33	.....
Granite City	32.50	33.50	33.50	.....	.....	Philadelphia	Swedeland	1.01	36.01	36.51	37.01	37.51	.....
Neville Island	33.00	33.50	33.50	34.00	.....	Philadelphia	Birdsboro	1.49	.....	.....	.....	.....	40.49
Provo	33.00	33.50	.....	.....	.....	San Francisco	Provo	5.94	38.94	39.44	.....	.....	.....
Sharpsville	33.00	33.50	33.50	34.00	.....	Seattle	Provo	5.94	38.94	39.44	.....	.....	.....
Steelton	34.00	.....	.....	.....	39.00	St. Louis	Granite City	0.75 Arb.	33.25	34.25	34.25	.....	.....
Struthers, Ohio	33.50	.....	.....	.....	.....								
Swedeland	37.50	35.50	36.00	36.50	.....								
Toledo	32.50	33.00	33.50	34.00	.....								
Troy, N. Y.	34.00	34.50	35.00	35.50	39.00								
Youngstown	33.00	33.50	33.50	34.00	.....								

Basing point prices are subject to switching charges; silicon differentials (not to exceed 50¢ per ton for each 0.25 pct silicon content in excess of base grade which is 1.75 to 2.25 pct); phosphorus differentials, a reduction of 38¢ per ton for phosphorus content of 0.70 pct and over; manganese differentials, a charge not to exceed 50¢ per ton for each 0.50 pct manganese content in excess of 1.00 pct. $2 per ton extra may be charged for 0.5 to 0.75 pct nickel content and $1 per ton extra for each additional 0.25 pct nickel.

Silvery iron silicon 6.00 to 6.50 pct, C/L per g.t., f.o.b. Jackson, Ohio—$40.50; f.o.b. Buffalo—$41.75. Add $1.00 per ton for each additional 0.50 pct Si, up to 12 pct. Add 50¢ per ton for each 0.50 pct Mn over 1.00 pct. Add $1.00 per ton for 0.75 pct or more P. Bessemer ferrosilicon prices are $1.00 per ton above silvery iron prices of comparable analysis.

Charcoal pig iron base price for low phosphorous $40.50 per gross ton, f.o.b. Lyles, Tenn. Delivered to Chicago, $45.99. High phosphorous charcoal pig iron is not being produced.

Ferromanganese

78-82% Mn, maximum contract base price, gross ton, lump size, f.o.b. Baltimore, Philadelphia, New York, Birmingham, Rockwood, Tenn.

Carload lots (bulk)	$135.00
Less ton lots (packed)	157.00
F.o.b. Pittsburgh	139.50

$1.70 for each 1% above 82% Mn; penalty, $1.70 for each 1% below 78%.

Briquets—cents per pound of briquet, freight allowed, 66% contained Mn.

	Eastern	Central	Western
Carload, bulk	7.00	7.25	7.80
Ton lots	8.00	8.60	10.50
Less ton lots	8.40	9.00	10.90

Spiegeleisen

Contract prices, gross ton, lump, f.o.b. Palmerton, Pa.

	16-19% Mn 3% max. Si	19-21% Mn 3% max. Si
Carloads	$43.00	$44.00
F.o.b. Pittsburgh	47.00	48.00

Manganese Metal

Contract basis, 2 in. x down, cents per pound of metal, f.o.b. shipping point, freight allowed, eastern zone.

96% min. Mn, 0.2% max. C, 1% max. Si, 2% max. Fe.

Carload, bulk	30
L.c.l. lots	32

Electrolytic Manganese

F.o.b. Knoxville, Tenn., freight allowed east of Mississippi, cents per pound.

Carloads	32
Ton lots	34
Less ton lots	36

Low-Carbon Ferromanganese

Contract price, cents per pound Mn contained, lump size, f.o.b. shipping point, freight allowed, eastern zone.

	Carloads	Ton	Less
0.06% max. C, 0.06% P, 90% Mn	21.00	22.10	22.70
0.10% max. C	20.50	21.60	22.20
0.15% max. C	20.00	21.10	21.70
0.30% max. C	19.50	20.60	21.20
0.50% max. C	19.00	20.10	20.70
0.75% max. C, 7.00% max. Si	16.00	17.10	17.70

Silicomanganese

Contract basis, lump size, cents per pound of metal, f.o.b. shipping point, freight allowed, 65-70% Mn, 17-20% Si, 1.5% max. C.

Carload, bulk	6.65
Ton lots	7.70
Briquet, contract basis, carlots, bulk freight allowed, per lb of briquet	6.75
Ton lots	7.75
Less ton lots	8.15

Silvery Iron (electric furnace)

Si 14.01 to 14.50%, $56.00 f.o.b. Keokuk, Iowa; $52.75 f.o.b. Jackson, Ohio; $54.00 f.o.b. Niagara Falls. Add $1.00 per ton for each additional 0.50% Si up to and including 18%. Add $1.00 per ton for low impurities, not to exceed: P—0.05%, S—0.04%, C—1.00%.

Silicon Metal

Contract price, cents per pound contained Si, lump size, f.o.b. shipping point, freight allowed, for ton lots packed.

	Eastern	Central	Western
96% Si, 2% Fe	15.60	17.85	19.60
97% Si, 1% Fe	16.00	18.25	20.00

Ferrosilicon Briquets

Contract price, cents per pound of briquet, bulk, f.o.b. shipping point, freight allowed to destination, 40% Si. 1 lb Si briquets.

	Eastern	Central	Western
Carload, bulk	4.25	4.50	4.70
Ton lots	5.25	5.85	6.15
Less ton lots	5.65	6.25	6.55

Electric Ferrosilicon

Contract price, cents per pound contained Si, lump size in carloads, f.o.b. shipping point, freight allowed.

	Eastern	Central	Western
25% Si	11.65	...	...
50% Si	7.80	8.30	8.50
75% Si	10.00	10.30	11.05
80-90% Si	11.30	11.60	12.35
90-95% Si	12.80	13.10	13.80

Ferrochrome (65-72% Cr, 2% max. Si)

Contract prices, cents per pound, contained Cr, lump size in carloads, f.o.b. shipping point, freight allowed.

	Eastern	Central	Western
0.06% C	23.00	23.40	24.00
0.10% C	22.50	22.90	23.50
0.15% C	22.00	22.40	23.00
0.20% C	21.75	22.15	22.25
0.50% C	21.50	21.90	22.00
1.00% C	21.00	21.40	21.50
2.00% C	20.50	20.90	21.00
65-68% Cr, 4-9% C	15.60	16.00	16.15
62-66% Cr. 4-6% C. 6-9% Si	16.60	17.00	17.15

Briquets — contract price, cents per pound of briquet, f.o.b. shipping point, freight allowed, 60% chromium.

	Eastern	Central	Western
Carload, bulk	9.85	10.10	10.20
Ton lots	10.75	11.65	12.25
Less ton lots	11.15	12.05	12.65

High-Nitrogen Ferrochrome

Low-carbon type: 67-72% Cr, 0.75% N. Add 2¢ per lb to regular low carbon ferrochrome price schedule. Add 2¢ for each additional 0.25% N.

S. M. Ferrochrome

Contract price, cents per pound chrominum contained, lump size, f.o.b. shipping point, freight allowed.

High carbon type: 60-65% Cr, 4-6% Si, 4-6% Mn, 4-6% C.

	Eastern	Central	Western
Carload	16.70	17.10	17.25
Ton lots	17.90	19.20	20.00
Less ton lots	18.60	19.90	20.70

Low carbon type: 62-66% Cr, 4-6% Si, 4-6% Mn, 1.25% max. C.

	Eastern	Central	Western
Carload	21.00	21.40	21.50
Ton lots	22.35	23.00	24.20
Less ton lots	23.35	24.00	25.20

Chromium Metal

Contract prices, cents per lb, chromium contained, carload, f.o.b. shipping point, freight allowed, 97% min. Cr, 1% max. Fe.

	Eastern	Central	Western
0.20% max. C	83.50	85.00	86.25
0.50% max. C	79.50	81.00	82.25
9.00% min. C	79.50	81.00	82.25

Calcium—Silicon

Contract price per lb of alloy, lump, f.o.b. shipping point, freight allowed.

30-35% Ca, 60-65% Si, 3.00% max. Fe or 28-32% Ca, 60-65% Si, 6.00% max. Fe.

	Eastern	Central	Western
Carloads	14.00	14.50	16.55
Ton lots	16.10	16.85	19.00
Less ton lots	17.10	17.85	20.00

Calcium—Manganese—Silicon

Contract prices, cents per lb of alloy, lump, f.o.b. shipping point, freight allowed.

16-20% Ca, 14-18% Mn, 53-59% Si.

	Eastern	Central	Western
Carloads	15.50	16.00	18.05
Ton lots	17.60	18.45	20.20
Less ton lots	18.60	19.45	21.20

Calcium Metal

Eastern zone contract prices, cents per pound of metal, f.o.b. shipping point, freight allowed. Add 1.5¢ for central zone; 3.5¢ for western zone.

	Cast Turnings	Distilled
Ton lots	$1.60	$2.35 $2.95
Less ton lots	1.95	2.70 3.75

CMSZ

Contract price, cents per pound of alloy, f.o.b. shipping point, freight allowed.

Alloy 4: 45-49% Cr, 4-6% Mn, 18-21% Si, 1.25-1.75% Zr, 3.00-4.5% C.

Alloy 5: 50-56% Cr, 4-6% Mn, 13.50-16.00% Si, 0.75 to 1.25% Zr, 3.50-5.00% C.

	Eastern	Central	Western
Ton lots	16.00	17.10	19.05
Less ton lots	16.75	17.85	19.80

SMZ

Contract price, cents per pound of alloy, f.o.b. shipping point, freight allowed. 60-65% Si, 5-7% Mn. 5-7% Zr, 20% Fe, ½ in. x 12 mesh.

	Eastern	Central	Western
Ton lots	14.25	15.35	17.30
Less ton lots	15.00	16.10	18.05

Other Ferroalloys

Ferrotungsten, standard, lump or ¼x down, packed, f.o.b. plant Niagara Falls, Washington, Pa., York, Pa., per pound contained T, 5 ton lots, freight allowed... $2.08

Ferrovanadium, 35-55%, contract basis, f.o.b. plant, freight allowances, per pound contained V.

Openhearth	$2.70
Crucible	$2.80
High speed steel (Primos)	$2.90

Vanadium pentoxide, 88-92% V_2O_5 technical grade, contract basis, per pound contained V_2O_5 $1.10

Ferrocolumbium, 50-60%, contract basis, f.o.b. plant, freight allowed. per pound contained Cb

Ton lots	$2.50
Les ton lots	$2.55

Ferromolybdenum, 55-75%, f.o.b. Langeloth, Washington, Pa., per pound contained Mo ..... 95¢

Calcium molybdate, 40-45%, f.o.b. Langeloth, Washington, Pa., per pound contained Mo..... 80¢

Molybdenum oxide briquets, 48-52% Mo, f.o.b. Langeloth, Pa., per pound contained Mo..... 80¢

Molybdenum oxide, in cans, f.o.b. Langeloth and Washington, Pa., per pound contained Mo..... 80¢

Ferrotitanium, 40-45%, 0.10%C max., f.o.b. Niagara Falls, N. Y., ton lots, per pound contained Ti $1.23
Less ton lots $1.25

Ferrotitanium, 20-25%, 0.10%C max., ton lots, per pound contained Ti $1.35
Less ton lots $1.40

High carbon ferrotitanium, 15-20%, 6-8% C, contract basis, f.o.b. Niagara Falls, freight allowed, carloads, per net ton..$142.50

Ferrophosphorus, electrolytic, 23-26%, carlots, f.o.b. (Siglo) Tenn., $3 unitage per gross ton $65.00

Zirconium, 35-40%, contract basis, f.o.b. plant, freight allowed, per pound of alloy.
Carload lots ..... 17.00¢

Zirconium, 12-15%, contract basis, lump, f.o.b. plant, freight allowed, per pound of alloy
Carload, bulk ..... 5.50¢

Alsifer, 20% Al, 40% Si, 40% Fe, contract basis, f.o.b. Niagara Falls, carload ..... 6.25¢
Ton lots ..... 6.75¢

Simanal, 20% Si, 20% Mn, 20% Al, contract basis, f.o.b. Philo, Ohio, freight allowed, per pound
Car lots ..... 9.00¢
Ton lots ..... 9.75¢

Boron Agents

Contract prices per pound of alloy, f.o.b. shipping point, freight allowed.

Ferroboron, 17.50% min. B, 1.50% max. Si, 0.50% max. Al, 0.50% max. C.

	Eastern	Central	Western
Less ton lots	$1.30	$1.3075	$1.329

Manganese—Boron 75.00% Mn, 15-20% B, 5% max. Fe, 1.50% max. Si, 3.00% max C.

Ton lots	$1.89	$1.903	$1.935
Less ton lots	2.01	2.023	2.055

Nickel—Boron 15-18% B, 1.00% max. Al, 1.50% max. Si, 0.50% max. C, 3.00% max. Fe, balance Ni.

Less ton lots	$2.10	$2.1125	$2.1445

Silcaz, contract basis, f.o.b. plant freight allowed, per pound.
Carload lots ..... 35¢

Grainal, f.o.b. Bridgeville, Pa., freight allowed, 50 lb and over.

No. 1	87.5¢
No. 6	60¢
No. 79	45¢

Bortram, f.o.b. Niagara Falls

Ton lots, per pound	45¢
Less ton lots, per pound	50¢

Carbortam, f.o.b., Suspension Bridge, N.Y., freight allowed, Ti 15—17%, B 0.90—1.15%, Si 2.5—3.0%, Al 1.0—2.0%.
Ton lots. per pound ..... 8.0¢

Steel Transportation Costs in Peak Year Were $872.5 Million

New York

• • • **The transportation** charges on the iron and steel industry's raw materials and finished products during 1944, the year of record steel production, were $872,515,000, according to a special study recently completed by the American Iron & Steel Institute. That amount was equivalent to one-eighth of the sales revenue of the entire iron and steel industry in that year. It was more than four times the net earnings of the industry.

More than 40 pct of the total represented transportation charges on products leaving furnaces and mills, by rail, water or truck. The outgoing shipments accounted for $364,118,000 of the transportation bill.

The remainder represented the cost of bringing into the mills and furnaces huge quantities of raw materials consumed in iron and steel production, as well as other supplies needed for operations. The inbound freight charges were $508,397,000. In that year the industry consumed approximately 100 million tons of iron ore, 95 million tons of coal, 2 billion gallons of fuel oil, and 17 million tons of purchased scrap, among other materials.

The study made by the Institute was confined to the iron and steel industry proper and does not include shipments of subsidiaries engaged in other activities. Freight charges on interplant shipments are included, however.

In 1945, transportation charges totaled $773,408,000, of which 40 pct covered outgoing products. The transportation bill was equal to about one-fifth of the total payroll of Class I railroads in 1945.

It would be difficult to relate the transportation charges above to other years. There have been changes in the types of products shipped by the industry and in distribution of its products. Railroad freight rates, the largest segment of the industry's 1944 and 1945 freight bills, have undergone several changes in recent years. Increased railroad freight rates on July 1, 1946 and Jan. 1, 1947, have raised the steel industry's rail freight bill by 20 pr ct above June 1946 rates.

The total dollar figure covering inbound freight charges includes all the transportation charges which iron and steel companies pay to transportation agencies and it includes most of the freight charges on inbound shipments sold f.o.b. mill at destination. However, it includes some charges on inbound shipments prepaid by shippers.

The total dollar figure covering outbound freight charges, shipped away from furnaces and mills, includes all freight charges which are prepaid by iron and steel companies. It includes some freight from mills to destination shipped collect.

Turns Compressed Air Into Hot and Cold Air Without Moving Parts

Pittsburgh

• • • **A "hot-cold pipe"** 15 in. long and 1 in. in diameter that converts ordinary compressed air into both hot and cold air without the aid of moving parts has been built by Westinghouse research engineers. As yet scientists have no explanation for the phenomenon, though it is conjectured that the cause may be a frictional effect between gases moving at different velocities. To study the principle involved a working model has been made.

In operation compressed air is pumped into a nozzle at one end of the pipe. There it strikes the inner wall of the pipe tangential to the diameter and is converted into a whirlpool of spinning gases. The air in the center becomes cold almost instantly while that on the periphery gets warm. The cold air is drawn off through a ¼-in. opening at the center of one end, while the warm air is tapped from the periphery.

With the original tube, 0.3 in. in diameter, R. Hilsch, its German inventor, claims to have produced simultaneous jets at 154° F. and 10° F. The present model has purposely been constructed larger in diameter to expedite instrumentation for scientific study. For this reason it gives a tem-

HALF A DOZEN JETS: *The Army Air Forces' new 6-engine jet bomber, the XB-48. The ship is shown at the Glenn L. Martin Baltimore plant where it has been undergoing ground and taxi tests. Wingspan is 108 ft 4 in.; overall length is 85 ft 9 in.*

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WHEN YOU
CAN
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Pushing material around is not only slow, hard work — it's costly material handling — there's an easy way to do it.

Investigate the use of conveyors. Conveyors handle a wide variety of parts, packages, units, cans, bottles, barrels, bundles, drums and boxes. Available in light, medium or heavy-duty types — portable or stationary — as systems, sections or units — power or gravity fed, they give you remarkable savings in time, money and manpower conservation. They relieve confusion and congestion.

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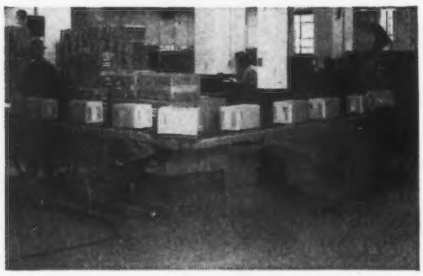
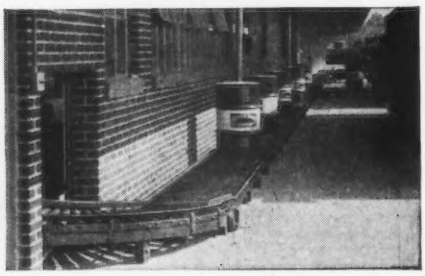
PRODUCTION LINES
Slat type conveyor used to speed assembly and crating of refrigerators.



STORAGE AREAS
Portable "Handibilt" conveyors used as a continuous conveyor line in storage area.



LOADING PLATFORM
Oil drums leave the warehouse for loading into boxcars on gravity roller system.

ROLLER · BELT · SLAT · PUSHBAR CONVEYORS • PORTABLE CONVEYORS AND PILERS • SPIRAL CHUTES • PNEUMATIC TUBE SYSTEMS

perature difference of only several degrees F.

Low efficiency rules out commercial application at this time, but like the "blue glow" in Edison's experimental electric light that led to his invention of the first electronic tube, it may lead to unexpected developments. Even now it holds promise as a handy laboratory tool for making cold as simply as a Bunsen burner makes heat.

Large Nickel Facilities Of Cuban Company To Be Declared Surplus

Washington

• • • **One of the** largest industrial enterprises in Cuba, the nickel mining and processing facilities, added to the Nicaro Nickel Co. by the government at a cost of $35 million will shortly be declared surplus by the RFC and turned over to WAA for disposal.

Sponsored by the WPB to supply complete facilities for the Nicaro company during the war, the plant is designed to treat approximately 5000 tons of wet nickel ore per day or the equivalent of 3600 tons of dry ore and to produce about 1333 tons a month of contained nickel in the form of nickel oxide.

The 1183-acre property is located in Oriente Province and in addition to the plant the project includes a complete housing project for 1800 employees and families together with necessary utilities, the 7.7 miles of railroad and necessary easements.

Included in the equipment are ore stripping and mining units, crushers and dryers, mixers, grinders, ore reducing equipment, cooling and mixing machinery, separating and washing units, a recovery plant and other facilities.

The nickel mines are owned by the Nicaro Nickel Co., a subsidiary of the Freeport Sulphur Co., which jointly with RFC owns the company and capital stock.

WAA says it plans to dispose of the property when received on a basis which will assure continued operation of both the mines and processing plants, not only because of its importance to the Cuban economy but because of its iron ore possibilities for which there would be a heavy demand along the Atlantic seaboard.

...Putting the FINGER on Costs

Calculating costs by machine is no job for big, muscular fingers. The slender, agile hands of a girl produce your answers much more quickly and accurately. You don't need brute strength in your cost department—what you want is speed and precision.

But out in the shop, where costs are really determined, it's a different story. There the combination of speed and precision in machinery of tremendous power pays off in dollars. As every production man knows, no other method can beat *press* costs in volume operations because pressed parts are finished parts, but until Clearing came into the picture, tolerances on stampings were never expected to be very close.

Today, with a Clearing, you can get *press*-production economy on many parts formerly made by more costly methods. Large or small, Clearing presses control their brute power so accurately that variations in the finished output can be expressed only in thousandths. If you're cost-minded, that should mean a great deal to you.

Let Clearing engineers work with you in planning your production on *presses*—the economical way. Let us show you how Clearing's unique design and construction features make such economy practical in new production techniques. It costs you nothing to put your problems up to our experienced staff.

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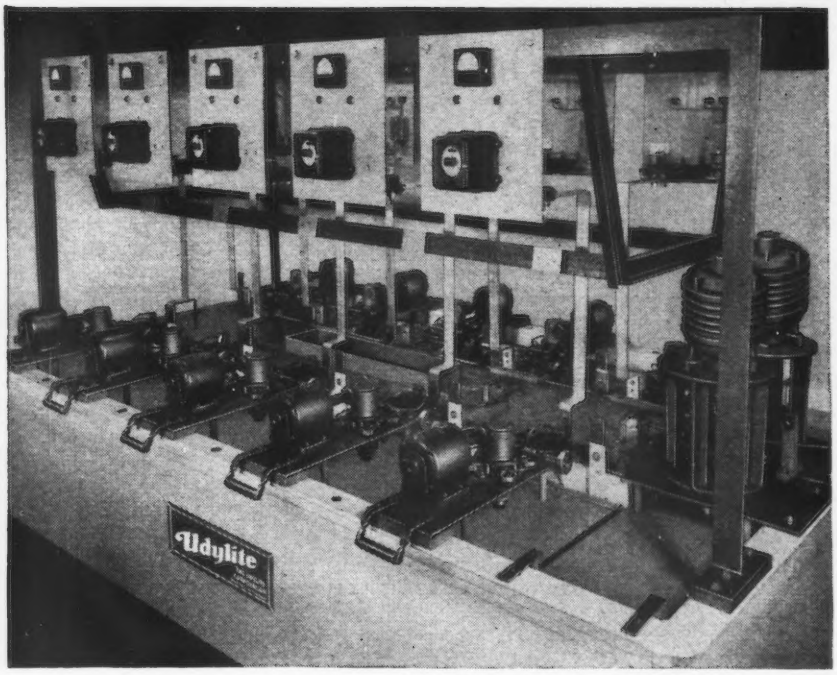

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Recording of symphonies and other musical compositions for the phonograph has connected the immortal work of Beethoven and Udylite Engineering.

From the original costly wax recording to the multiplicity of record stampers, electroplating performs each of the five steps of duplication. By no other process can extremely fine details be reproduced so accurately. Each step has always required many hours of plating time to secure high fidelity reproducing qualities.

With almost two years of continuous research and experimentation, Udylite produced the plating machine illustrated —the result of a perfect combination of specialized electrical, mechanical and chemical engineering. This machine has not only cut the plating time 80 percent, but produces a better product of greater fidelity. Again, with Udylite the promise is fulfilled.

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SEE US AT THE INDUSTRIAL FINISHING EXPOSITION in DETROIT IN JUNE

OMR Reveals Quantity Of Strategic Materials It Will Sell to Users

Washington

• • • **The Office of** Metals Reserve revealed recently the minimum quantities of certain strategic and critical materials which it will sell to industrial users. Included are: Aluminum, asbestos, beryl, bismuth, cadmium, chromite, copper, corundum, graphite, lead, manganese, mica and zinc.

OMR in making sales will be guided by the recommendations of CPA as to buyers and quantities. CPA will consider applications and make recommendations to OMR on the basis of the following criteria:

(1) The applicant requires the material for his own immediate use in its present form; or

(2) The applicant is a distributor of the material engaged in supplying the needs of small businesses, whose current requirements are less than the RFC minimum sales quantities, and the distributor undertakes to make the material purchased by him available only to persons recommended by CPA.

In these limited cases, recommendations will be made only upon the further findings by CPA that:

(1) The use of a substitute or less scarce material is not practical.

(2) The material is not available from private sources, foreign or domestic.

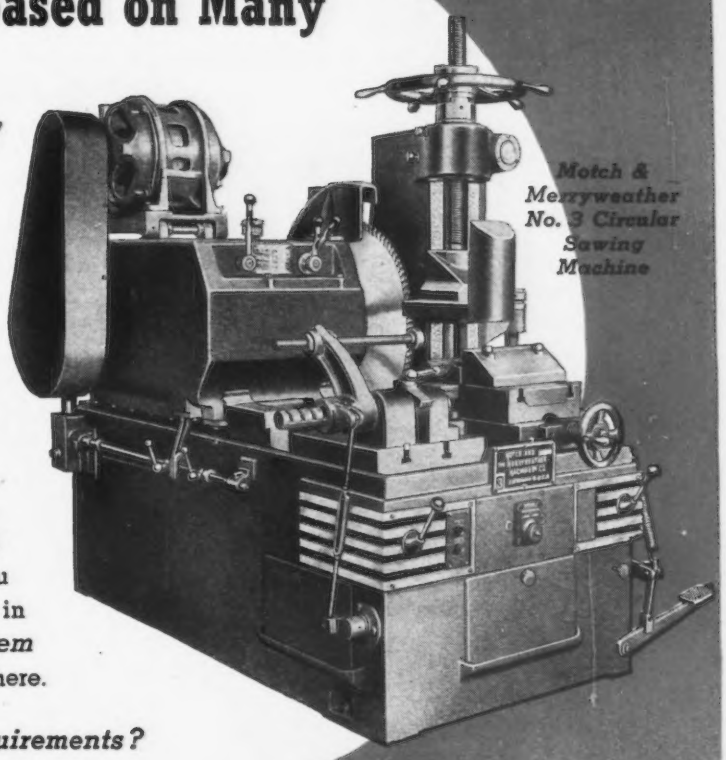
(3) The quantity of material requested, including materials in inventory and to be received from other sources will not result in more than a minimum working inventory.

(4) In respect to any material in which the OMR stocks are extremely limited in relation to the amounts required to meet industrial deficiencies, as established by CPA under the Strategic and Critical Stock Piling Act, recommendations to sell will generally be made only in cases of emergency such as to prevent a plant shut down or for public health and safety.

Application to purchase the materials shown in the accompanying

Only from Motch & Merryweather can you get Engineering Service based on Many Years devoted to

"Building All 3"



Motch & Merryweather No. 3 Circular Sawing Machine

A range of Triple-Chip circular sawing machines for work up to 16½", handling iron, steel, aluminum, brass, bronze, magnesium and other materials. A range of Triple-Chip saw blades from 8" to 70" diameter (smaller sizes for milling and slitting, too). Three Triple-Chip blade sharpening machines which give the necessary cam-generated tooth form. A staff of sales engineers equipped by training and experience to consult with you for your profit. An unparalleled experience in building "all three" and *making them produce.* The answers, sir, are here.

What are your sawing requirements?

Only M & M builds ALL 3: CIRCULAR SAW, SAW BLADE, BLADE GRINDER

THE MOTCH & MERRYWEATHER MACHINERY CO.
PENTON BUILDING CLEVELAND 13, OHIO

270-ft. rotary kiln at Anaconda, Montana

Anaconda
MANGANESE
NODULES

AVERAGE ANALYSIS

Mn	60%
SiO_2	8%
Al_2O_3	0.76%
Fe	3.1%
P	0.06%

46381

ANACONDA
from mine to consumer

ANACONDA COPPER MINING COMPANY
Offices: 25 Broadway, New York 4, N. Y.
Anaconda, Montana

tabulation should be made to CPA on Form MR-45.

Minimum Quantities of Critical Materials to be Sold by OMR

Metals and Minerals	Minimum Sales Quantities
Aluminum: Primary pig	Minimum Carload
Asbestos: Rhodesian Chrysotile fiber (grade C and G1, C & G/2) African Amosite fiber (grades 3/DM1, B3 and D3)	Minimum Carload
Beryl. Ores or concentrates	Minimum Carload
Bismuth: Metal	1 case[1]
Cadmium: Metal	100 lbs[2]
Chromite: Metallurgical and chemical ores and concentrates	Minimum Carload
Copper: Electrolytic or fire refined copper; cathodes, wire bars, cakes, slabs, ingot bars, billet, or bars	Minimum Carload[3]
Corundum: Canadian concentrates	No minimum necessary
Graphite: Madagascar flake and fines and Ceylon lump	Minimum Carload 10 tons
Pig lead	Minimum Carload[4]
Manganese: Metallurgical ores	Minimum Carload
Mica: Muscovite block, film and splittings	No minimum necessary
Zinc: Slab, zinc oxide, ores and concentrates	Minimum Carload[5]

Notes:

(1) In view of the extremely limited supply, recommendation will be made only for the urgent needs of the Armed Forces or where bismuth metal is required for emergency use for public health and safety and it cannot be supplanted by drugs ordinarily furnished to hospitals and similar institutions.

(2) In view of the extremely limited supply, recommendation will be made only in cases of emergency.

(3) In view of the extremely limited supply, recommendation will be made only in cases of emergency.

(4) In view of the extremely limited supply, recommendation will be made only in cases of emergency.

(5) In view of the extremely limited supply of metal (slab) and zinc oxide, recommendations will be made only in cases of emergency.

Approves Foundry Building

Washington

• • • **Approval for the** construction of a new foundry building by the Central Foundry Div., General Motors Corp., at Defiance, Ohio, has been given by the Office of the Housing Expediter. Estimated to cost approximately $1,900,000, the foundry will engage in the production of gray iron castings.

At the same time, the Facilities Review Committee approved an $87,000 chemical laboratory to be constructed by the Carnegie-Illinois Steel Corp. at Gary, Inc.; a $75,000 factory by the Superior Metal Co. of Bethlehem, Pa., and a $385,000 factory by Kingston-Conley Electric Co. of Cambridge, Ohio, for the manufacture of fractional horsepower motors.

The CONE AUTOMATIC MACHINE COMPANY sees many GOOD THINGS AHEAD

It is reported that . . . . . .

"Styrofoam," styron plastic expanded 40 times into a multicellular, foamlike mass, is being offered by Dow Chemical Co., as an insulating material.

get ready with CONE for tomorrow

Soft enough to be machined, punched or drawn, two new magnet metals, Cunico and Cunife, have been developed by General Electric Co.

be ready with CONE for today

Large and complex glass-to-metal seals are made at Westinghouse Lamp Division by spraying liquid-suspended powdered glass on hot Kovar metal.

get ready with CONE for tomorrow

Especially intended to prevent shifting of loads in freight cars and trucks, Load-Lok, a glue made by National Adhesives, has high sheer strength, but can be broken at will in unloading.

be ready with CONE for today

The new Lycoming XR-7755, a 36-cylinder radial, develops 5,000 h.p. at 2,600 r.p.m., and is said to be the world's most powerful aircraft engine.

get ready with CONE for tomorrow

The U. S. Department of Agriculture is now operating an experimental alcohol plant at Peoria with a capacity of 500 gallons per day from farm waste.

be ready with CONE for today

U. S. Rubber Co. is selling a lighter-than-cork cellular rubber that is resistant to moisture, fire, rot, acid, oil, vermin and termites.

get ready with CONE for tomorrow

Union Pacific R. R. has placed orders for 64 diesel-electric locomotives. This is said to be the largest order for diesel-electric locomotives in railroad history.

Atlantic Coast Fisheries Co. has developed a machine with which one operator can fillet haddock at the rate of 45 per minute.

get ready with CONE for tomorrow

Barber-Colman Co. has a new machine to automatically perform threading-up operations on textile looms by the use of punched cards.

be ready with CONE for today

The Pennsylvania Coal Co. will supply its miners with music by means of loud speakers at the top and bottom of the mine shaft.

get ready with CONE for tomorrow

A simple change in tread design makes the new Firestone Tractor Tire out-pull previous tires.

The Spang-Chalfant Div. of National Supply Co. in Pittsburgh is making steel pipe with a baked-on phenolic plastic coating which has been tested for several years in the oil fields.

be ready with CONE for today

Hobart Bros. Co. has designed a self-propelled and self-powered mobile arc welder for use in railway yards, oil refineries and large factories.

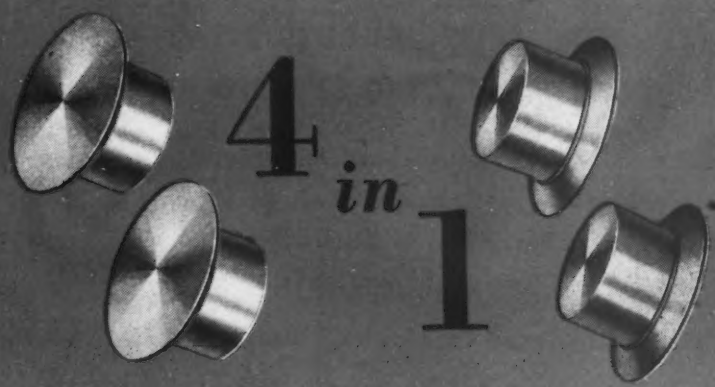
get ready with CONE for tomorrow

The thumbnail size silicon crystals made by Sylvania Electric Products can be used as first detectors in superheterodyne receivers, and unlike tubes, require little space and no filament supply.

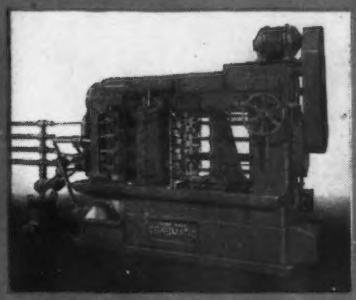
be ready with CONE for today

The Locomotive Development Committee of Bituminous Coal Research expects to conduct on-the-rail tests of its coal-fired gas turbine locomotive this summer.

FOLLOW THESE PAGES FOR NEWS OF PROGRESSIVE PRODUCTION



Four parts in the time for one is profitable production. The pieces shown are made, four at a time, from SAE 1112 in 5¼ seconds each. Investigate profit possibilities of the Conomatic Vertical in your shop. Write for information.



Ask your CONE representative to show you our new color motion picture

CONE

AUTOMATIC MACHINE CO., INC. ★ WINDSOR, VERMONT, U. S. A.

39

DON'TCHA KNOW BETTER THAN T'REACH OVER A MACHINE WHEN IT'S RUNNIN'?
I DIDN'T REACH, I SLIPPED-- THERE AIN'T NO SOL-SPEEDI-DRI ON MY FLOOR!
TOO LATE
T. M. REG. U. S. PAT. OFF. COPR. 1944 BY NEA SERVICE, INC.
J R WILLIAMS

SOL-SPEEDI-DRI CUTS DOWN ON ACCIDENTS CAUSED BY SLIPS AND FALLS

SOL-SPEEDI-DRI is the fast-working absorbent that soaks up all types of liquids and makes floors clean and safe. It works . . . while you work in safety. Sweep it up and floors are home-clean! Anyone can use it . . . requires no machinery. It's safe, sure, economical.

Safety and Maintenance Co., Inc., No. 1 Wall Street, New York 5, N. Y.

Industrialists Invited To Join Committees By Army-Navy Board

Washington

• • • **The Army-Navy Munitions Board has invited 50 industrialists and businessmen to become members of three industry advisory committees now being set up to assist the Board in its stockpiling program.**

Industries which will be affected by the three committees, forerunners of several such groups (THE IRON AGE, Feb. 13, p. 104) are nonferrous metals, copper and copper base alloys, and aluminum and magnesium.

Work of the committees will be to help formulate a workable program for accumulating a permanent stockpile of critical and strategic materials. They will study the situation, help determine to what degree a material is critical, in what amounts it should be stockpiled, its availability and best sources, and will advise on problems of acquisition, processing and maintenance.

Other industries for which advisory committees are to be formed in the near future include iron and steel, ferrous and nonferrous additive alloys, nonmetallic minerals, fuels, fibers, rubber, forest products, textiles, foods, leathers, and oils, fats and waxes. A chemical and drug committee has functioned since during the war.

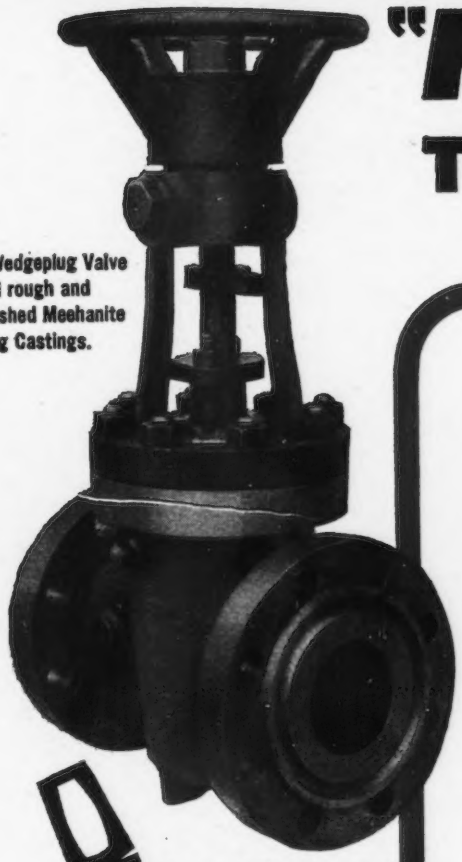
These committees now under formation will be largely concerned with raw materials and processed items up to the end-product stage. Later, other committees will be organized to confer with and to advise the Board as to how best to supply and use the end-products and their component parts.

Those to whom invitations have been sent for the three groups now being organized are:

Nonferrous Metals: Carl A. Ilgenfritz, vice-president in charge of purchases, U. S. Steel Corp., J. H. McElhinney, vice-president in charge of operations, Wheeling Steel Co., Robert E. Dwyer, Anaconda Copper Mining Co., Howard I. Young, president, American Zinc, Lead & Smelting Co., J. M. Bowley, president, Eagle-Picher Mining & Smelting Co., Leo Halpern, assistant to president, American Smelting & Refining Co.

O. W. Billharz, Billharz Mining Co., G. H. Chambers, vice-president, Foote Mineral Co., Benna Elkan, National Zinc Co., Marshall L. Havey, executive vice-president,

"MEEHANITE MEETS THESE CONDITIONS"



A Wedgeplug Valve and rough and finished Meehanite Plug Castings.

A group of Plug Castings of various sizes prior to finishing.

In the construction of their line of valves, the Wedgeplug Co., Inc., New Orleans, La., make extensive use of Meehanite Castings. When questioned as to the reasons and results, they replied as follows:

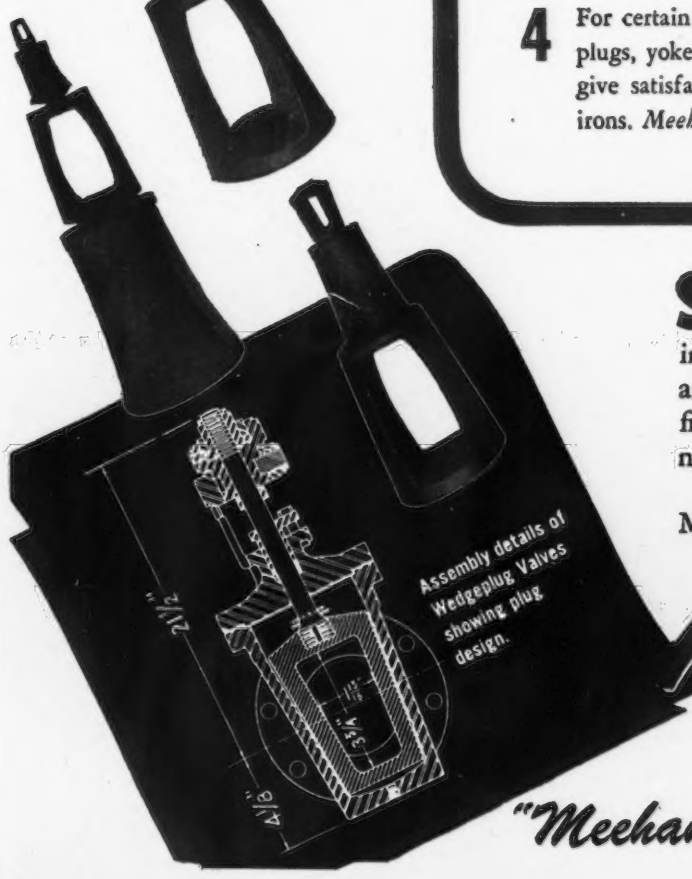
"We enumerate a few of the reasons for using Meehanite plug castings and the future use in body and yoke castings as follows:

1. In steel plug valves, it is desirable to have a plug material different in structure and hardness from the steel body material, but with adequate strength for the pressure loads. Heat-treated Meehanite provides these.

2. The plug material must act similarly to steel under high temperatures and grain growth must be controlled. Meehanite provides these service requirements.

3. To provide a tight seat lapping, characteristics must be such that proper control can be accomplished. This Meehanite provides.

4. For certain services, namely, acid, alkali and erosion, bodies, plugs, yokes and even stems should be of special materials to give satisfactory service not found in steels and normal cast irons. *Meehanite meets these conditions.*"



Assembly details of Wedgeplug Valves showing plug design.

Similar experiences are being recorded in industrial plants all over the world. More and more Meehanite Castings are being specified by designers, engineering, and maintenance departments.

For complete details write for the Meehanite Handbook.

Meehanite

Pershing Square Building
New Rochelle, N. Y.

"Meehanite Means Better Castings"

Whether a press is large or small, its operation creates vibration. And uncontrolled vibration wears out machinery prematurely, weakens building structure, causes accidents and breakdowns, spoiled work, and lowered employee efficiency.

Korfund Vibration Control isolates vibration and reduces its costly effects. Years of experience with thousands of successful installations have resulted in the development of standard Vibro-Isolators in a complete range of sizes. These practical, efficient units are recommended for punch presses, drop hammers, shears and other machinery. They are sold on a "Satisfaction Guaranteed" basis.

Write for bulletins giving further information. If you'll send us details of your machinery—type, make and size—we'll gladly submit recommendations without obligation.

"When it's a question of vibration, Korfund has the answer."

KORFUND
VIBRATION
CONTROL

THE KORFUND COMPANY, Inc., 48-35 32nd PL., LONG ISLAND CITY 1, NEW YORK

N. J. Zinc Co., Fletcher W. Rockwell, chairman of the board, National Lead Co., Samuel H. Williston, vice-president, Cordero Mining Co., Andrew Fletcher, president, St. Joseph Lead Co., N. W. Rice, president, U. S. Smelting, Refining & Mining Co., Charles Pack, vice-president, Doehler Jarvis Corp., and Sidney Cohn, Sigmund Cohn & Co.

Aluminum and Magnesium: I. W. Wilson, Aluminum Co. of America, Irving T. Bennett, vice-president, Revere Copper & Brass Inc., R. S. Reynolds, Jr., Reynolds Metals Co., D. A. Rhoades, vice-president, The Permanente Metals Corp., Wiser Brown, vice-president, American Magnesium Corp., Leo B. Grant, sales manager, Magnesium Div., The Dow Chemical Co., C. J. Amick, Century Metalcraft Corp., L. M. Brile, Fairmont Aluminum Co., P. A. Dulin, Jr., president, Dulin Bauxite Co., O. L. Earl, Acme Aluminum Foundry Co., J. G. G. Frost, Aluminum & Magnesium Inc., J. G. Landrigan, United Wire & Supply Corp., G. W. Motherwell, vice-president, Wyman-Gordon Products Corp., Charles Pack, vice-president, Doehler Jarvis Corp., R. J. Roshirt, Bohn Aluminum & Magnesium Corp., W. A. Singer, Apex Smelting Co., Ralph L. Wilcox, Gerrity Michigan Die-Casting Co., George N. Wright, The John Harsch Bronze & Foundry Co.

Copper and Copper Base Alloys: R. E. Dwyer, Anaconda Copper Mining Co., Russell J. Parker, asst. to president, Kennecot Copper Corp., Leo Halpern, asst. to president, American Smelting & Refining Co., K. C. Brownell, vice-president, American Smelting & Refining Co., S. Cates, president, Phelps Dodge Refining Corp., M. W. Acker, Olin Industries, Inc., Alfred Bellis, John A. Roebling Sons Co., W. J. Bullock, president, W. J. Bullock, Inc., B. J. Flaherty, Johnson Bronze Co., J. H. Goss, president, Seeville Manu Co., Benjamin Harris, president, Benjamin Harris & Co., E. R. Lovell, Calumet & Hecla Consolidated Copper Co., A. J. McNabb, Magna Copper Co., W. W. Rarity, National Brass Works, H. W. Steinkraus, president, Bridgeport Brass Co., and D. N. Zimmer, American Metal Co.

Machinery Backlogs Peacetime's Greatest

Pittsburgh

• • • **United Engineering & Foundry Co.** reported recently a backlog of business that "exceeds any peacetime volume in the history of the company."

F. C. Biggert, Jr., chairman of the board, told stockholders at the annual meeting that the company looks for improvement in its operations in 1947. He commented that the producing capacity of the heavy machinery industry now is fairly well-absorbed, "reducing substantially the severe effect of competition."

Efforts to obtain foreign business were recounted to stockholders, Mr. Biggert stating a London office has been organized. K. C. Gardner, president of the company, and G. G. Beard, vice-president and executive assistant, are in London now.

"Arc Booster" Simplifies AC Welding

Lincoln Electric announces new industrial type AC welder

A NEW heavy-duty transformer type welder, the "Fleet-Arc" has been introduced by The Lincoln Electric Company which improves AC welding by affording greater ease of arc striking, deeper penetration at the start, wider range of output, greater economy of operation and greater safety. It is applicable to a wide range of applications throughout industry.

A feature known as the "Arc Booster" gives the arc a burst of current the instant the electrode touches the work, starting the arc automatically. The current then returns in a fraction of a second to the amount set for the job. A selector switch provides adjustment of the booster current for any degree of arc striking intensity to suit the job.

Improves Penetration at Start

To improve penetration at the start of a bead, the "Arc Booster" of this new welder can be set to dig in with deep penetration. This is especially important for tack welds and short beads.

Improves Arc Characteristics

The welder has a reactor type of control which is a free circuit, designed for high responsiveness to changing arc conditions. It is separate from the main transformer which is designed for high efficiency. This design gives high arc sensitivity for maximum ease and speed of welding under all conditions; it makes possible an exceptionally wide range of output; and it improves power efficiency.

Current Adjustment is Continuous

The rotating reactor control provides step-less, smooth, accurate adjustment of welding current over the entire range of the welder. The operator simply turns a hand wheel. A double reduction chain drive makes it easy to turn the control and requires a minimum number of turns of the handle to cover the range. The amperage is indicated on a dial on the front of the welder.

The reactor current control is held in position by rugged cone brakes, preventing vibration and wear of the control mechanism.

Increases Safety

The open circuit voltage of the "Fleet-Arc" AC welders never exceeds 63 to 70 volts (depending on welder capacity). This eliminates the hazards of the high open circuit voltages which are used in the usual AC welders to improve arc striking.

Reduces Idle Power Consumption

The independent control circuit eliminates the need for high open circuit voltage, contributes to higher power factor. By reducing amount of condensers needed as much as 66%, this new welder minimizes idle power input.

Is Completely Self-Protected

A thermostatic device protects the windings of the welder from damage due to overheating, opening the welder's magnetic starter under such conditions. This feature permits the welder to be used at high current values for sustained periods without danger of burn-out.

Immediate Delivery

The new welders are available from stock in ratings of 200, 300 and 500 amperes. Complete information on the "Fleet-Arc" AC Welders is given in Bul. 366 which may be had by writing The Lincoln Electric Company, Dept. 145, Cleveland 1, Ohio.

Advertisement

It Really Pays to Remove Drawing Lubricants the Oakite Way!

When lubricants are not completely removed from drawn or pressed work, increased costs can result from such causes as these:

1. If the lubricant contains water, steel shapes are likely to rust.

2. Rejects may occur in painting and enameling.

3. Lubricant left on drawn work may be burned-in during annealing, forming deposits that are more difficult to remove later.

4. Deposits built up on metal surfaces slow production in seam- and spot-welding machines.

These four "pocketbook" reasons indicate why specialized Oakite cleaning compounds are so widely preferred for removing drawing lubricants. They clean thoroughly, safely, quickly. Let your Oakite Technical Service Representative study your lubricant-removal problems. Arrange NOW for his free, money-saving service. No obligation.

OAKITE PRODUCTS, INC.
30H Thames Street, NEW YORK 6, N. Y.
Technical Representatives in Principal Cities of U. S. & Canada

OAKITE

Specialized Industrial Cleaning
MATERIALS • METHODS • SERVICE

Foundation to Sponsor Foundry Study in Five Engineering Colleges

Cleveland

• • • Five American engineering colleges—Case Institute of Technology in Cleveland, Cornell University at Ithaca, N. Y.; Massachusetts Institute of Technology at Cambridge, Mass.; University of Cincinnati at Cincinnati, and University of Wisconsin at Madison, Wis.—will offer new courses in foundry engineering training next fall and 50 students will enter these courses on scholarships. This is being accomplished through the finances and equipment supplied by the Foundry Educational Foundation, incorporated by members of the foundry industry of the nation, according to an announcement by John M. Price, president of Ferro Machine & Foundry, Inc., of Cleveland, and chairman of the new organization.

A fund raising campaign for $280,000 will be conducted in May and June by the Foundry Educational Foundation to carry on this work during the next 3 years. Regional co-chairmen are being named by Mr. Price to work in their respective geographical areas on the campaign.

The three big foundry trade associations—The American Foundrymen's Assn., The Gray Iron Founders' Society and The Malleable Founders' Society—have joined forces as founding members to launch this long range program in the interests of the entire foundry industry.

This program of education is the outgrowth of a 2-year study by the Joint Ferrous Foundry Educational Committee and the nonprofit Foundry Educational Foundation and is being directed by a board of trustees consisting of: B. D. Claffey, General Malleable Corp.; R. W. Crannell, Lehigh Foundries, Inc.; Anthony Haswell, Dayton Malleable Iron Co.; J. M. Price, Ferro Machine & Foundry Inc.; Peter Rentschler, Hamilton Foundry & Machine Co.; Fred Sefing, International Nickel Co.; James H. Smith, Central Foundry Div. of General Motors Corp.; and S. C. Wassen, National Malleable & Steel Castings Co.

Briggs Mfg. Co., at 42 Pct Capacity in 1946, Shows Operating Loss

Detroit

• • • Net profits for 1946 of $4,308,115, equal to $2.25 per share, have been announced by Briggs Mfg. Co., Detroit, and its domestic subsidiaries. Sales by Briggs of automobile bodies, body parts and Briggs Beautyware plumbing fixtures aggregated $125,598,031, the report said.

The Briggs income account showed an operating loss of $5,319,885; however, a tax refund of $7,900,000, together with $1,800,000 of reserve for reconversion returned to income during 1946 resulted in a profit of $4,380,115.

Briggs was tooled to process 932,712,508 lb of steel in automobile body parts during 1946. Actually, the report said, it was able to process only 388,564,000 lb. The projected figure for 1947 production is 588 million lb of steel to be processed during the entire year.

During 1946 Briggs converted its Outer Drive plant to automobile parts manufacture as well as its big Conner plant, used during the war for building airplane wings and air frames.

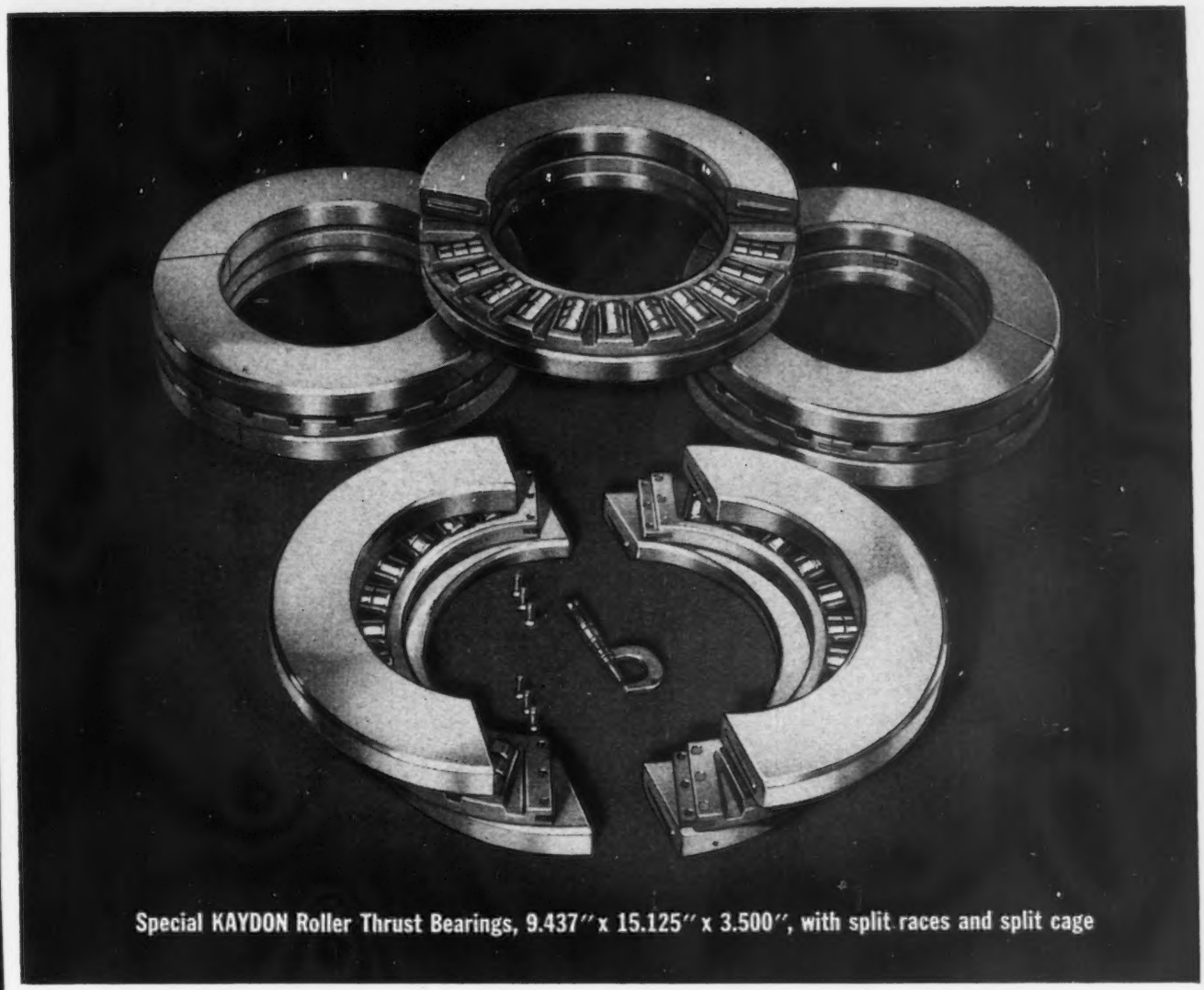
Output of Briggs Beautyware plumbing fixtures in 1946 totaled 27,323,128 lb, compared with the prewar output of 19,788,548 lb. Projected production for 1947 of formed metal fixtures is 39 million lb, according to Briggs officials.

March WAA Disposals Top $1 Billion Mark

Washington

• • • March disposals of surplus property amounted to $1229 million, according to preliminary figures released by WAA, thereby marking the third successive month in which disposals topped the billion mark.

A breakdown shows sales accounting for $663 million of the total, representing a recovery of approximately 24¢ on the dollar and indicating a declining rate of return as demand diminishes. The



Special KAYDON Roller Thrust Bearings, 9.437" x 15.125" x 3.500", with split races and split cage

KAYDON *Split* BEARINGS

Easy to put on or take off without dismantling machine

EASY on . . . easy off! These special KAYDON Roller Thrust Bearings have split races and a split cage . . . so you don't have to dismantle the machine to assemble them into position or to remove them from the shaft. There are many applications where this unique type of bearing is a big saver of time and money.

The precision engineering and ingenuity which make these special bearings perform so successfully are major factors in KAYDON procedure to assure dependable quality, rugged strength, and high precision in all KAYDON standard and special bearings . . . from 4" bore to the extremely large KAYDON Bearings, up to 10 feet outside diameter. • In many fields of heavy-duty machinery, KAYDON Bearings help designers add important advantages. Steel mill equipment that operates under terrific loads and high temperatures, mammoth paper mill machinery, huge precision grinders, rugged road-building units, excavators, hoists, crushers, bending machines and other heavy-duty machines, are serving industry better because of KAYDON Bearings.

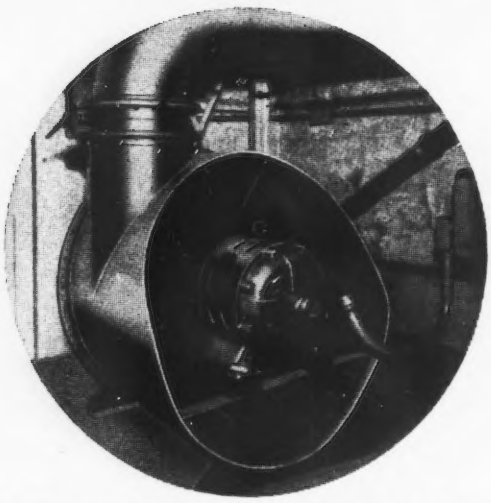
* * *

Expand your opportunities through use of these modern bearings. Capacity now available for all types and sizes. Contact KAYDON, in confidence!

KAYDON *Types of Standard or Special Bearings:*
Spherical Roller • Taper Roller • Ball Radial
Ball Thrust • Roller Radial • Roller Thrust

THE KAYDON ENGINEERING CORP., MUSKEGON, MICH.

All types of Ball and Roller Bearings 4" bore to 120" outside diameter



Spencer Foundry Turbo

SPENCER FOUNDRY PROTECTION

for Men, Melts and the Pours

Spencer Turbos are the accepted standard for foundry cupolas because they provide maximum reliability of the air supply over long continuous service. Constant volume or weight of air can be maintained by hand or automatic control whichever is preferred.

High dust counts and shut-downs must be kept to a minimum in the modern foundry.

Spencer Vacuum Cleaners, stationary or portable, remove overhead dirt, clean patterns, molds and castings, and reclaim foundry sand. It helps keep the dust count down.

Both machines are of the centrifugal type with wide clearances, light weight impellers, low peripheral speeds, and only two bearings.

The result, a quiet running machine which requires no special foundations. For reliability, we can refer you to Spencers that have been in service 25 to 40 years.

ASK FOR THESE SPENCER BULLETINS

No. 131	General Information
No. 116	Piping and Valves
No. 137	Boiler Cleaning
No. 102	Portable Vacuum Cleaners
No. 125	Central Vacuum Cleaners
No. 130	Sump Tank Cleaner
No. 143	Pneumatic Conveying
No. 142	Turbo-Agitation
No. 127	Turbo-Compressors
No. 109	Gas Boosters
No. 112	Foundry Blowers

Cleaning molds with Spencer Vacuum

332-D

SPENCER HARTFORD

THE SPENCER TURBINE CO.
HARTFORD 6, CONN.

cumulative rate of recovery through Dec. 31, 1946, was 32 pct.

The remainder of the overall figure is accounted for by $521 million in miscellaneous disposals, which include donations and scrapping and about $45 million in leases.

Real property continued as the largest single disposal category, $463 million worth having been sold or leased during the month. Consumer and producer goods amounted to $334 million.

Estimates show that approximately $16 billion worth of surplus has been disposed of to date and that the current inventory has been reduced to about $8.7 billion.

Arkansas Power & Light Purchases Incomplete Surplus Power Plant

Washington

• • • **The incomplete** surplus Lake Catherine power plant located at Jones Mills, Ark., valued at $1,385,000, has been purchased by the Arkansas Power & Light Co. for $925,000 cash, it has been announced.

Construction was originally sponsored by the WPB for the purpose of serving two potlines of the Alcoa aluminum reduction plant at Jones Mills. Work was canceled about the time the facilities were ready for machinery installation, the two 35,000 kw units diverted elsewhere and two private power concerns called upon to supply power for Alcoa.

Arkansas Power & Light plans to spend more than $8.8 million in completing the plant and installing equipment capable of generating not less than 80,000 kw. Most of this capacity will be sold to the Reynolds Metals Co. which last year acquired the surplus Alcoa plant at Jones Mills.

This was one of eight surplus real property deals reported by WAA last week in which facilities costing $4.7 million were disposed of for $2.7 million, netting the government the unusually good return of about 55¢ on the dollar for its war facilities.

The Lycoming division of the AVCO Mfg. Corp. of Williamsport, Pa., paid $560,000 cash for the $882,500 internal combustion en-

EASE of HANDLING

Here's proof that Elwell-Parker trucks are easy to handle! This amputee driver, provided with a suitable attachment, is "as competent as any two-handed driver."

one of the reasons why ELWELL-PARKERS are preferred!

Elwell-Parker's advanced design and construction make the driver *the master of the truck at all times*—he is alert, confident and capable. Here are some of the reasons:

FINGER-TIP CONTROLS—They are easily reached and insure complete and instant control of every movement—backward . . . forward . . . raising or lowering the load. Only the drive controller must be held at "on"; it turns to "off" the moment the driver releases the handle—an important safety feature. Motors for the various truck actions can be operated simultaneously.

ORIGINAL AND PROVEN BRAKING SYSTEM—The brake action is fast—soft yet positive. Brakes can be applied when power is on, so that starting or stopping on ramps is easy and safe.

COMFORTABLE, SAFE OPERATION—Cushioned pedals, easy steering, controlled speed, and smooth, quiet operation reduce fatigue, keep the driver alert and careful. Power steer furnished on larger models. On trucks with four or six wheel steer, each tire turns on a concentric circle to facilitate steering and save wear. Standing position does give the driver complete control of his heavy duty truck in the most crowded quarters. It also does enable him to dismount from either side of truck in case of emergency.

For actual demonstration of these features, plus proper application of the trucks to your specific needs, call in the nearest EP man. The Elwell-Parker Electric Company, 4225 St. Clair Avenue, Cleveland 14, Ohio.

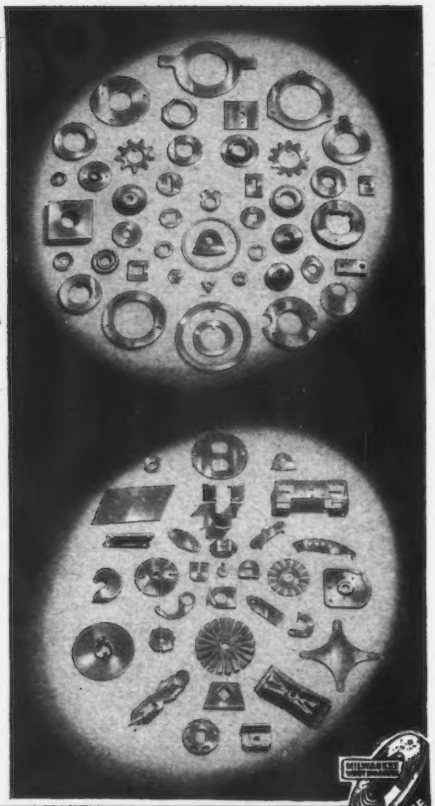
ELWELL-PARKER

Established 1893

POWER INDUSTRIAL TRUCKS

60 YEARS OF SERVICE to INDUSTRY

SUPPLYING
WASHERS
and
STAMPINGS
OF EVERY DESCRIPTION
FOR EVERY PURPOSE...
UTILIZING MORE THAN
22,000 SETS OF DIES
Let Us Quote On Your Needs!



WROUGHT WASHER MFG. CO.
THE WORLD'S LARGEST PRODUCER OF WASHERS
2202 SOUTH BAY STREET • MILWAUKEE 7, WISCONSIN

Alloy Steel Service from Seven Warehouses!

A.I.S.I. HY-TEN S.A.E.
ALLOY STEELS

Cutting to length, Heat treating, Forging. Testing, Turning, Special Finishes. Prompt shipment of rounds, squares, flats, hexagons, octagons, and billets.

Technical information and recommendations.

Write for our data sheet book

WHEELOCK, LOVEJOY & COMPANY, INC.
(Est. 1846)
126 Sidney St. Cambridge 39, Mass.
Cleveland 14, Chicago 23, Hillside, N. J., Detroit 3, Buffalo 10, Cincinnati 32

gine plant at Williamsport, operated during the war by the Aviation Corp. It consists of three buildings and six acres of land.

Empire Chemical Co., a subsidiary of Pittsburgh Coke & Chemical Co., has purchased at a cost of $525,000 a partially constructed phthalic anhydride facility, consisting of 2.3 acres of land and five partially completed buildings located in the center of Pittsburgh Coke's Neville Island plant at Pittsburgh. Although the government had $1.2 million dollars invested in the plant, it could not be operated independently or removed and was sold for slightly less than the valuation of $670,000.

E. R. Godfrey & Sons have purchased for $209,000 cash three buildings at the Milwaukee Ordnance plant which were formerly used in processing rocket powder and cost originally about $265,300. They will be converted into grocery warehouses.

American Welding & Mfg. Co. has purchased for $200,000 a government plant at Warren, Ohio, which it operated for special war production during the war.

Nat'l Conference Board Elects New Members

New York

• • • **Three councillors** and 38 board members were elected or reelected at the 286th meeting of the National Industrial Conference Board held in New York.

Sewell L. Avery, chairman of the board, Montgomery Ward & Co., and General Robert E. Wood, chairman of the board, Sears, Roebuck & Co., were elected councillors of The Conference Board.

The New York executives who were elected for a 1-year term are Willard Chevalier, vice-president and executive assistant to president, McGraw-Hill Publishing Co., and Alexander Fraser, president, Shell Oil Co.

The Conference Board, founded in 1916, is an independent and nonprofit institution for research and education in the fields of economics and business. The work of the board is supported by nearly 3000 business concerns, trade associations, labor unions, government bureaus, libraries, colleges and universities.

New Rules for Surplus Sales at Fixed Prices

Washington

• • • **Under revised** procedures, buyers of surplus property at fixed price sales come under the same rules which require deposits in bid and auction sales. However, buyers who have established credit with WAA are exempt from the ruling, and under special conditions, deposits may be waived by zone or regional directors.

Purchasers of personal property are required to make a deposit of 10 pct on fixed price or bid sales up to $100,000 with an additional 2 pct on purchases or bids over that amount.

For industrial real property, the bidder must deposit 1 pct of the bid price or $500, whichever is greater, with a maximum of $25,000 required; for leases, WAA requires 10 pct of the first year rental or $500, whichever is greater, also with a $25,000 maximum.

Bids for nonindustrial real property must be accompanied by 10 pct up to $2500 with the full bid price required for bids of $50 or less.

Properties requiring special bid forms or covered by special conditions will have deposit requirements to suit while governmental agencies and certain institutions are exempted from deposit requirements.

Poland to Export Coal Under Trade Agreement

Washington

• • • **Trade agreements** with European nations by which large tonnages of coal as well as other materials will be exported from Poland in exchange for materials consisting largely of industrial machinery and equipment, power and communications equipment have been revealed by the Polish Embassy.

Some 3 million tons of coal at $11.30 to $12.70 a ton and $58 million in other materials will be exported to Sweden in exchange for $28 million worth of iron ore and machinery with the balance to be made available in foreign exchange. A second agreement provides for a credit over a period of 4 years for the purchase of $28

SURE, WE'VE MET... I'M CRIMPY THE BUFFALO WIRE CLOTH MAN

I don't mean to brag, but **WHEN I'M SQUARE MESH STAINLESS STEEL** . . . you can't top me for sizing, separating, bolting and filtering jobs . . . especially in such industries as abrasive, sand, refractory, minerals, salt, chemical, flour, food, textile, paint and pharmaceutical.

I'M TOUGH – CAN ABSORB IMPACT!

It's hard to wear me out . . . and then I "wear clean". In fact, I last 4 times longer than many other fabrics. Break? I doubt if you can do it. After all, I've twice the tensile strength of ordinary steel.

100 PROOF...THAT'S ME!

I'm rustproof, tarnish proof, corrosion resistant, wear resistant, non-contaminating, non-discoloring. Need any more proof? Even high temperatures don't weaken me.

MOISTURE OR HUMIDITY DON'T BOTHER ME!

I'm efficient in all kinds of weather...don't take on moisture or swell like non-metallic cloths. That's why I'm used so much for bolting.

I'M FAST AS LIGHTNING!

With my smooth, polished surface, things whiz through me . . . very important in the smaller meshes, you know, to avoid blinding.

Buffalo SQUARE MESH STAINLESS STEEL WIRE CLOTH

is available in bolting and market grades, as well as special types for Salt Filter Slurry Screens and Backing Wire. It is furnished in rolls, cut pieces, reel covers or panels bound with webbing.

HELPFUL LITERATURE FREE ON REQUEST
Bulletin 590 Bolting Cloth
Bulletin 596 Market Grade
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Buffalo WIRE WORKS CO., INC.
Manufacturer of All Kinds of Wire Cloth Since 1869

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ANY METAL • ANY PERFORATION

Industrial—Well balanced screens of excellent material and workmanship to assure maximum screen production combined with durability.

Ornamental—Approved patterns and finishes including many exclusive and characteristic designs for grilles and furniture. We invite your inquiries.

The Harrington & King PERFORATING Co.

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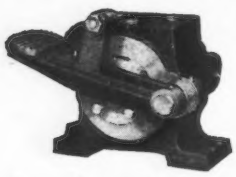
HANNIFIN VALVES

for all air cylinder control requirements



Rotary Type—ratchet action for advance and return of cylinder; 3 sizes.

Hand Operated Valves; 15 sizes and types.

Foot Operated Treadle Valve; 9 sizes and types.

Spring Return Foot or Hand Operated Valves; 6 sizes and types.

Duplex Valve for two cylinders.

Manifold Type, bottom connection. Used individually or with made-to-order manifolds; 9 sizes and types.

The Hannifin Packless Valve Design *insures* year after year of maintenance-free service. 48 low cost models to choose from. Request Bulletin 57-A.

HANNIFIN CORPORATION
CHICAGO 24

million in electric power equipment, $20 million in telecommunications, $11 million in machinery, and $52 million for industrial equipment and other goods.

A third agreement has been signed, the Embassy said, by which Finland will take delivery of 1 million tons of coal while in return for the equivalent $12 million Poland will get copper, prefabricated houses, and woodpulp.

Other talks are being held by which Poland expects to negotiate exchange of coal with Hungary for oil and industrial equipment.

Shipments of Porcelain Enameled Products In February Drop 10 Pct

Pittsburgh

• • • **Dollar value** of shipments of porcelain enameled products for February 1947, totaling $7 million, showed a drop of 10 pct from January totals. This total was, however, 260 pct of that reported for February 1945 and 160 pct of shipment value for February 1946, according to the Porcelain Enamel Institute, Washington, D. C.

The institute reported also that the dollar value of store front and other architectural porcelain enameled parts shipped in February totaled $119,877, against shipments valued at $159,737 in January and $56,060 in Feb., 1946.

Shipment values for: Refrigerator parts in February were $573,476, against $538,070 in January; stove parts, $734,176 in February and $825,241 in January, and washing machine parts, $870,362 in February and $787,675 in January. These values do not represent shipments of parts produced and assembled into completed end products. They represent 230 pct of the same totals for February 1946.

Table tops, kitchen cabinets and breakfast and dinette set porcelain enameled parts shipped in February were valued at $482,867, as compared with $513,509 in January and $260,447 in February 1946.

Reflectors, including fluorescent reflectors, accounted for porcelain enameled products in February valued at $456,865, as compared with shipments in January valued at $599,573 and in February 1946 valued at $171,169.

The London Economist

(CONTINUED FROM PAGE 129)

political color of the recipient is a question which is being watched with rather bitter interest by those who do not trust Mr. Peron as much as Ambassador Messersmith might like.

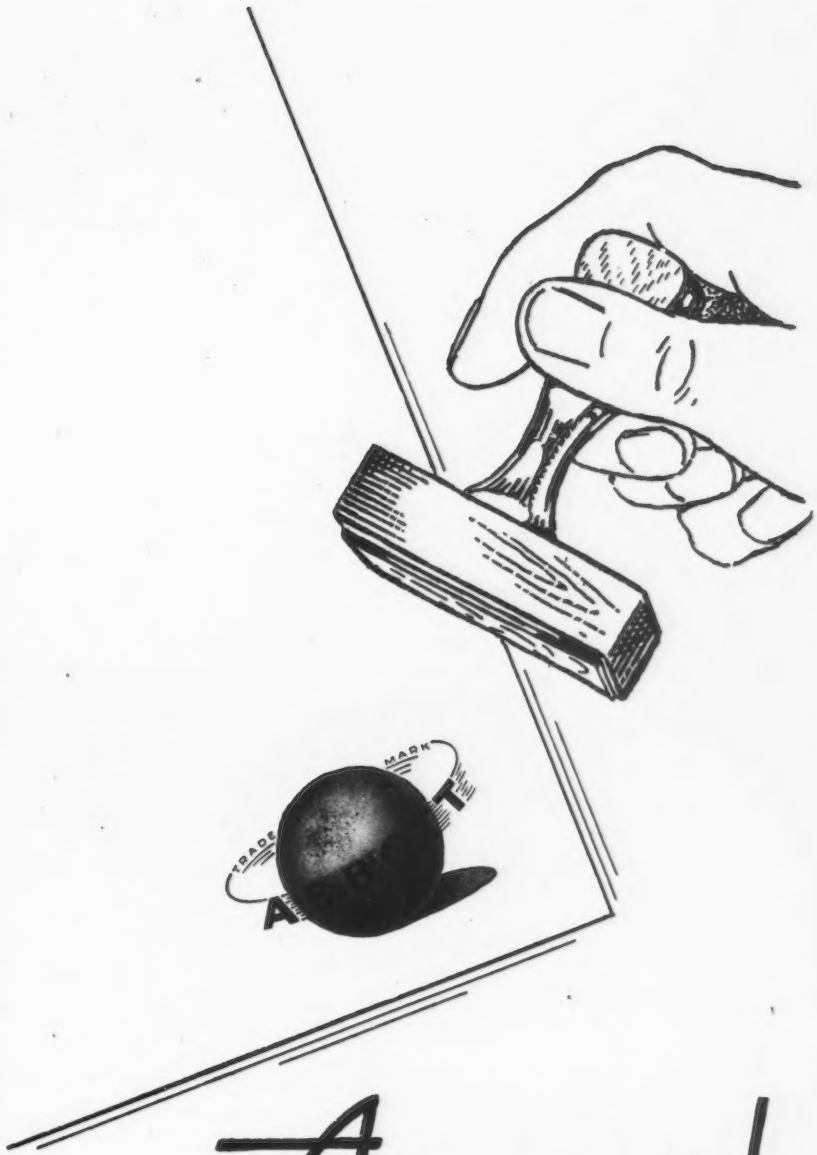
Moving west, across the international date line the policy stiffens. To free Korea has been a declared American intent since 1943; to free it in the American way became difficult when Japanese forces in the north surrendered to the Russians and split the country in two.

In 1946 a Joint U.S.-Soviet Commission was appointed to set up a provisional Korean democratic government, but it bogged down in arguments over what democratic meant in terms of Korean politics. Marshall now informs Molotov that "the United States, mindful of its obligations under the Moscow Agreement, sees no alternative to taking without further delay, such steps as will advance the purposes of that agreement."

Wallace's speeches on the eastern side of the Atlantic are affecting the new policy, though not in the direction which Wallace would prefer. Not only do they raise the blood pressure of his enemies in both political parties; recently they stirred those enemies into a positive enthusiasm for the Bill to extend aid to Greece and Turkey. The inverse galvanic effect of the Wallace crusade was a decisive Senate vote for the President's policy.

Ironic though this action may seem, the Wallace evangel cannot be taken too lightly. Whatever his offense against political etiquette—an offense shared by Messrs. Churchill and Laski—Mr. Wallace still holds the key to the conscience of the American liberal. That he has not always used it wisely does not save them from a sense of sin when he chooses to stalk and talk as a prophet.

Many of them believe that the policy of amity which he is preaching has been tried and has failed, but that he should continue to advocate it makes them newly aware of the dangers to an irritated world that lie in the policy of hard realism which has taken its place. Whether he can capitalize on this sensitivity for his own political advantage is more dubious; but the discomfort he is causing his friends may make them look more closely



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WELDIT GASAVER

● Cuts Gas and Oxygen Cost!
● Eliminates Dangerous Fire Hazard!

With Weldit Gasaver installed the operator simply hangs his torch on the handy lever rod of the Gasaver. The weight of the torch pulls the lever rod down, closing the valves of the Gasaver, thus shutting off both gas and oxygen intake lines. The usual idle flame and needless waste of oxygen and gas between operations is thus eliminated—no fire hazard or danger of injury to workers.

When the torch is again picked up for further welding operations, the operator passes it across the pilot light of the Gasaver, thereby instantly igniting the torch at the pre-adjusted flame, ready for work—no adjustments to make.

Gasaver can be installed any convenient place on the line between regulators and torch. Most of America's largest production plants are now Gasaver equipped.

Listed as standard by Underwriters' Laboratories and by New York City Board of Standards and Appeals.

Some distributor territory still available.

Weldit INC. SINCE 1918

992 OAKMAN BLVD. • DETROIT 6, MICH.

ROUSTABOUT CRANE

Two men with this mobile load-hustler are a whole work force in your plant and yard—fast action with hook or magnet, loads to 7½ tons. Flexible performance, built for years of overwork. Save costly delays and man-power . . write for the yard-profit facts.

THE HUGHES-KEENAN COMPANY
571 NEWMAN STREET . . . MANSFIELD, OHIO

ROUSTABOUT CRANE

Roustabout Cranes
By Hughes-Keenan

Load-Handling Specialists Since 1904

into the potential perils of the course he is attacking.

Meanwhile the costs, at home and abroad, of the emergent policy of expansive defense are beginning to attract analysis. Representative Herter of Massachusetts has introduced into the House a Bill calling for a committee on foreign aid to consider relating the foreign expenditure of the United States to its resources and objectives.

Exclusive of the bill for aid to Greece and Turkey, which calls for $400 million, there has already been allocated, in goods or money, $16,788 million for foreign spending, a figure which is eloquent even in the United States. Food prices have already risen in reply, cartoonists see the scrawny curs of inflation sniffing in the national dooryard, economists discuss the reallocation of resources which will be necessary if American wealth is to be spread so far and hence so thin.

And Mr. Baruch, dedicating his own portrait in the South Carolina legislature, calls on the nation to work harder and for longer hours "if we are to regain our heritage; if we are again to be missioners of hope and to be rewarded for our effort . . . Until we straighten out and solve our own problems of production, and have internal stability, there is no basis on which the world can renew itself."

The cost of the new policy abroad, in terms of influence and durable friendliness within the United Nations and with individual governments, remains to be assayed. Indications that the policy is any more successful in persuading Russia to cooperate than was the less militant policy it replaced are hard to find, but there is no indication that the converse is true. Russia stirs her great bulk only after the last card has been played, and that moment has not come.

As for Britain, the problem is more complex, and whether the Labor government will choose to regard the nascent military republic as bulwark or competitor in Western Europe is a vital choice that is yet to be announced.

Meanwhile the power of the motor force presently at work may be gaged from a sentence in the report which Marshall (then General Marshall) made to the President in 1945

in his capacity of Chief of Staff. "We may again elect to depend on others and the whim and error of potential enemies, but if we do we will be carrying the freedom and treasure of this great nation in a paper bag." The work of providing luggage which shall be less vulnerable is now under way.

Weekly Gallup Polls

(CONTINUED FROM PAGE 125)

war than appeasement. The current mood or temper of the people is summarized in one statement from a voter polled recently by the institute. He said:

"If we let Russia get away with her aggressive policy, she'll start reaching out for more and more, and then we're bound to have a war on our hands. Dictators never know when to stop if you appease them."

When Gen. George Marshall took office as Secretary of State, an institute poll found the weight of opinion throughout the country in favor of a firmer policy toward Russia than that followed by his predecessor, James F. Byrnes.

The current polling finds a high uniformity of attitude among all groups in the population. Veterans, young, middle-aged and older voters, Democrats, Republicans, men, women—all think another war is likely within 25 years.

• • • **Although the majority** of Americans have from the beginning supported the United Nations and want to see it continue, they are by no means satisfied with the progress of the organization to date.

"It doesn't seem to have accomplished much . . . Not getting any place . . . It never seems to be able to get Russia to cooperate"—those are typical comments from voters polled by the institute.

People who take the opposite position say, "It's doing the best it can considering present-day conditions . . . A new organization of that size takes time to grow."

When the number expressing satisfaction or dissatisfaction is totaled, the division of opinion is as follows:

"Are you satisfied or dissatisfied with the

Cooked to order

As you know, a cupola can be charged with materials to produce the type of castings desired — that is, if the metallurgist understands what materials to specify.

We can give ***Strenes Metal*** a considerable range of characteristics by certain changes in the formula. This affords unusual flexibility in adapting ***Strenes Metal*** castings to the work they are required to do.

So, if you need a special hardening quality in a die, we can give it to you with ***Strenes Metal;*** or we can give you what you need in machinability, or toughness, or any reasonable combination of properties.

This is one of the reasons why more and more manufacturers of metal products are using ***Strenes Metal*** dies. If you're interested, we'll be glad to answer your questions.

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DRAWING AND FORMING DIES

THE ADVANCE FOUNDRY COMPANY
100 SEMINARY AVENUE — DAYTON 3, OHIO

proven performance

SELLS 6 OUT OF 10 GRAND RAPIDS GRINDERS

• Of every ten Grand Rapids Hydraulic Feed Surface Grinders sold, six are to customers already using Gallmeyer and Livingston grinding machinery.

FEATURES
• 125 feet per minute longitudinal table speed
• Separate motors to drive grinding wheel spindle and hydraulic mechanism
• Two spindle speeds to reduce wheel costs
• Portable, self-contained motor driven coolant system
• Vickers vane type hydraulic pump
• Starters, controls and motors easily accessible
• Special G & L spindle motor end-bells and over-size precision ball bearings
Write for Bulletin GL 101

Heavy, rugged, one-piece column and base of very close-grained grey iron.

Bijur one-shot lubricating system insures long life for bearings.

Patented vertical adjustment of wheel head.

GRAND RAPIDS GALLMEYER & LIVINGSTON CO.

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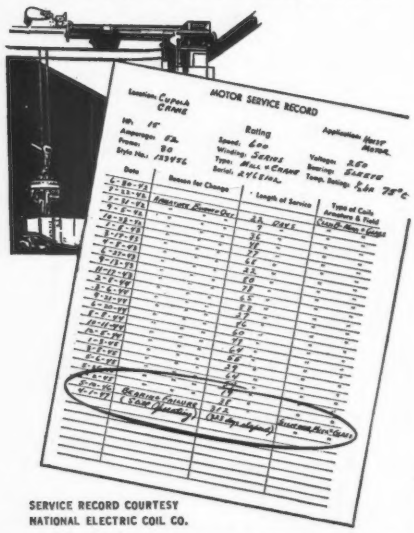
Silicone News

DC SILICONES

DC Silicone Insulation CUTS MOTOR FAILURE 90%!



SERVICE RECORD COURTESY NATIONAL ELECTRIC COIL CO.

A cupola crane motor used to unload scrap in a large steel mill was designed for intermittent service. But steel hungry America kept it working full time to meet war and postwar requirements. Insulated with the best Class 'B' materials, this motor failed 22 times in about three years, giving an average service life of only 50 days.

Design limitations made it impossible to install a larger motor. Lost time, costly rewinding, and heavy maintenance expense seemed inescapable—until DC Silicone Insulation was introduced by Dow Corning.

National Electric Coil Co., of Columbus, Ohio, was one of the first to realize the advantages of Silicone-glass-mica insulation. Their engineers redesigned the coils of that motor using Silicone Insulation—DC 996 Varnish with glass and mica.

Then it operated almost continuously for 312 days—six times the average life with Class 'B' insulation—before a bearing failed, causing mechanical failure of the insulation. The motor was again rewound with Silicone Insulation and was still running April 1, 1947—after 323 days!

DC Silicone Insulation will keep hard-working motors running at least 10 times as long as Class 'B' insulation. That's proved by three years of tough tests and field service. DC 996 is furth er described in leaflet No. S 3-7.

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MIDLAND, MICHIGAN
New York • Chicago • Cleveland • Los Angeles
In Canada: Fiberglas Canada, Ltd., Toronto
In England: Albright and Wilson, Ltd., London

Dow Corning
FIRST IN SILICONES

progress that the United Nations organization has made to date?"

	Pct
Satisfied	26
Dissatisfied	50
No opinion	24

Dissatisfaction with the progress of the UN has been expressed over a long period of time.

During the past year there have been five surveys testing public attitudes. Only once did more people express satisfaction than dissatisfaction. That was in early January of this year, after the UN session closed in December in a spirit of greater cooperation and agreement than had previously been found.

The trend of sentiment has been as follows:

	Satisfied Pct	Dissatisfied Pct	No Opin. Pct
May 1946	37	37	26
July	26	49	25
Nov.	27	43	30
Jan. 1947	39	33	28
Today	26	50	24

One very specific weak point of the UN, in the public's estimation, is the veto power.

When voters were asked to enumerate what they would consider to be the UN's weakest points, more mentioned the veto than any other factor. The next criticism is that there is too much arguing among the members, and too little agreement, while the third criticism is that the big nations have too much power and the small nations not enough voice in the organization.

Despite the criticisms, the American public thinks enough of the UN to feel that the Greek problem should have been turned over to it.

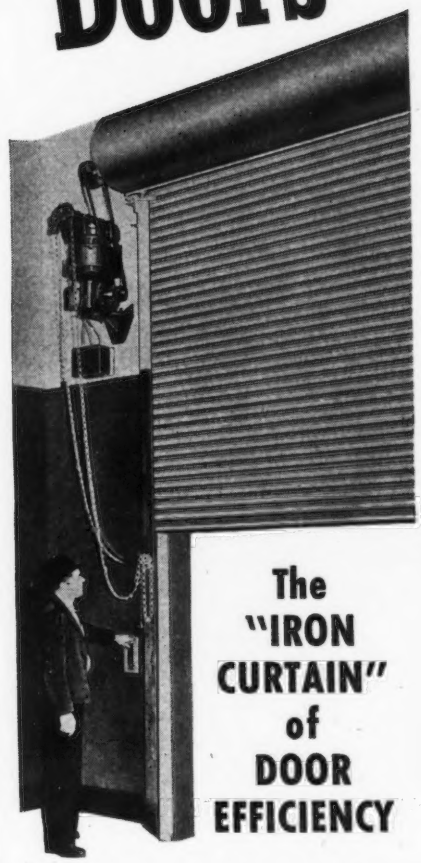
List Canada Mine Exports

Toronto

• • • **The Canadian mining** industry was a large contributor to the country's export trade in 1946, and exports from this source were only exceeded by agricultural products. In most instances, mineral exports last year exceeded those of 1945. Exports of specified minerals for the past 2 years were as follows:

	1946	1945
Aluminum	$56,030,000	$133,567,000
Nickel	55,205,000	54,778,000
Copper	37,005,000	40,860,000
Zinc	27,769,000	20,373,000
Asbestos	24,473,000	22,184,000
Precious metals (other than gold)	21,469,000	17,200,000
Lead	7,873,000	10,335,000
Iron ore	4,353,000	2,553,000

Kinnear Rolling Doors



The "IRON CURTAIN" of DOOR EFFICIENCY

The rugged, all-steel, interlocking-slat curtain of Kinnear Rolling Doors is the key to extra years of door efficiency *and protection—at lower cost.* Its famous *coiling upward action* saves time, permits full use of all adjacent floor and wall space, opens out of the way of damage by wind or vehicles. In every way, you get more efficiency per square foot of opening with Kinnear Rolling Doors. Write for catalog.

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Saving Ways in Doorways
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ROLLING DOORS

Battelle Expands Its Electronics Research Laboratory Facilities

Columbus, Ohio

• • • **Industrial and governmental** demand for research in electronics has resulted in an expansion of the electronics laboratories of Battelle Institute, Columbus, Ohio, director Clyde Williams has announced.

The expansion program, which has been under way for the past year, involves the allocation of more space to Battelle's electronic laboratories, the purchase of extensive equipment, the addition of new personnel, and the centralization of facilities for electronic research.

The expansion was made necessary, according to Mr. Williams, to take care of the growing demand for both fundamental and applied research in electronics. There is an increased consciousness of electronic controls in industry, and numerous industries have, he said, turned to Battelle for assistance in their control and instrumentation problems. These include industries as diverse as mining, metal products manufacturing, paper making, food processing, and chemical product manufacturing. Other industries are turning to the manufacturing of new electronic products, or to the use of electronics in connection with their products.

Battelle also is working currently on research projects in the electronics field for the Army Air Forces. One such project is a fundamental study of thermionic emitters and has as its ultimate objective the providing of data on electron-emitting materials which will make possible improvements in radar and other electronic products. Another project is concerned with voltage regulator tubes and has as its goal the development of tubes which will hold the voltage constant under a wide range of loads.

Electronic research at Battelle is under the direction of Dr. H. W. Russell and under the immediate supervision of Dr. H. R. Nelson and Dr. F. C. Todd. The facilities of the electronic laboratories are supplemented by the staff and facilities of the institute's 30 other research divisions and service departments.

I Found 50% More Storage Space Up There . . . It's All Free!

"We needed additional warehousing space—badly. First, we had thought of adding a bay or a new wing. The Crescent Electric PALLETIER proved to be a far less expensive addition. All the space we required became available—free. Vertical space—never before used. Now, tier after tier of our palletized materials are stacked to ceiling height."

The power-packed PALLETIER maneuvers easily in close quarters, climbs ramps, steps up loading and unloading of freight cars, ends demurrage. Users find that *one man replaces a crew,* lifting, transporting, stacking—easily, speedily, safely.

The Crescent Electric PALLETIER is available in 1000, 2000, 3000, 4000 and 6000 pound capacities. Write for free bulletins today.

CRESCENT TRUCK COMPANY
1105 Willow St. • Lebanon, Pa.
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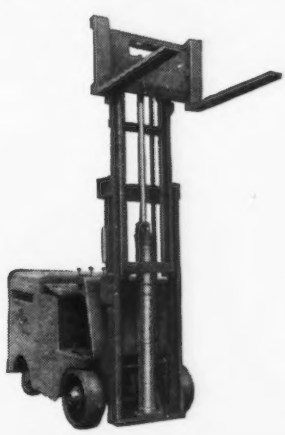
March the swing to Electric Industrial Trucks



ELECTRIC Crescent PALLETIER

PALLETIER ADVANTAGES

- Operator spots and tiers without stirring from seat.
- All control levers at driver's fingertips.
- Full magnetic control protects against forced acceleration.
- Inspections and adjustments simplified by easy accessibility to all mechanisms.
- Minimum maintenance costs.

This is the truck to take loads off your mind.

U. S. Rubber Develops Strong, Flexible Belt For Material Handling

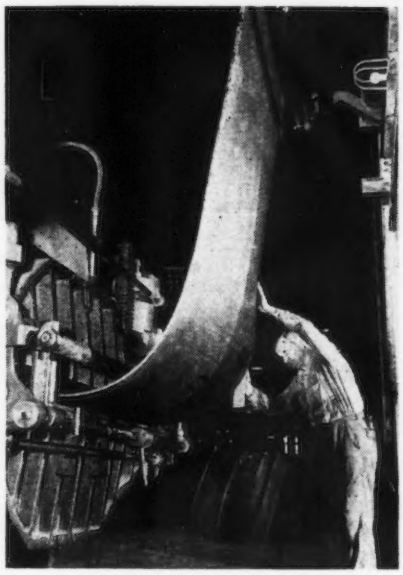
New York

• • • **A new development** in conveyor belting which is said to improve its usefulness for heavy duty materials handling over long distances has been announced by the U. S. Rubber Co. The new belt is surfaced with synthetic rubber and has a fabric inner core made up of nylon transverse cords and the newly developed Ustex cord, specially treated rayon, running the length of the belt. The new belting is especially designed for use in mines, quarries and large dam construction projects. It is designed to carry heavier loads than other rubber fabric belts and should extend the range of conveyors. It could eliminate some transfer points and extra driving mechanisms.

In addition to greater strength, the new belt has low stretch lengthwise and increased flexibility crosswise. These two features make it possible to build a longer and heavier belt with a minimum of stretch and excellent troughing qualities. The belt can be spliced easily and quickly, said to be an important consideration in installations where it is delivered in sections and made endless at the operating site. In the event of accidental damage, repairs can be made promptly by conventional repair techniques.

Ustex yarn, a development of U. S. Rubber Co. was used during the war for Army parachute harness and the new belt is its most important postwar application.

The rubber industry is turning out conveyor belts at the rate of $18 million a year, according to W. H. Cobb, vice-president. There has been a 40 pct increase in their use in factories, he said, but it is in mines and construction projects that the greatest expansion has taken place.



NEW CONVEYOR BELT: *How U. S. Rubber Co. finishes its newly developed Ustex fabric conveyor belt at its Passaic, N. J., plant. The belt is said to be 250 to 400 pct stronger than previous rubber-fabric belts.*

It is now entirely feasible to move materials on cross-country conveyor belts over great distances, Mr. Cobb stated. This method of transportation is being used on a growing scale to carry iron ore, copper ore, sand, gravel, rock and other raw materials.

Agrees to Increase Trade

London

• • • **Trade discussions** in Brussels between an official United Kingdom delegation representing the Board of Trade and the Treasury and representatives of the Belgian and Luxemburg Governments ended recently in mutual agreement that all possible steps should be taken to develop and increase trade between the U.K. and the Belgo-Luxemburg Economic Union.

The two delegations agreed on measures to facilitate substantial exports to the United Kingdom from Belgium and Luxemburg of a wide range of goods including steel products and other metals. Views were also exchanged on imports of U.K. goods into Belgium and Luxemburg, and the general balance of payment between the sterling and Belgian franc areas.

Sizes, types and spans to meet over 90% of all material handling.

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Maximum service life with minimum operation and upkeep expense.

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Standardization and jig machining assures interchanging of parts.

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21 SHIFTS per ★ ★ ★ WEEK without grumbling

In other words, a full time job outdoors.

Handling of 10,000 pound bundles of steel bars and billets with frequent overloads, is taken in stride by this Euclid Crane.

From truck and car to stockpile and back to truck and car, this "bottleneck smashing" crane replaced one of another make and has piled up an enviable service record.

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